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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 29 1941

COMBINED ACTIVE AND PASSIVE IMMUNIZATION AGAINST DIPHTHERIA

II. CONTROL OF EPIDEMICS IN THE FIELD*

BY

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In the previous paper (p. 717) evidence was brought to show that by means of combined active and passive immunization a degree of active immunity can be produced which, though slower in its development, is ultimately not greatly inferior to that resulting from active immunization alone.

Attention was drawn to the difficulty in practice of protecting children against diphtheria during the intermediate phase of relative susceptibility which, according to Gundel and König's (1938) experiments on guinea-pigs, probably occurs between the waning of passive immunity due to the injection of antitoxic serum and the development of active immunity due to inoculation with diphtheria prophylactic. Information on the length and degree of this intermediate phase of relative susceptibility cannot be obtained in human beings by the direct experimental method, but the observations of Gierthmühlen and Voges (1939) on children during an actual epidemic of diphtheria suggest that with doses of 0.3 to 0.5 c.cm. of A.P.T. and 1,000 units of antitoxin it is at its maximum between about three and six weeks after the first injection of A.P.T. and serum, and that it is considerably less in degree than the susceptibility of uninoculated children.

Though this information was not available to us when we were conducting the observations about to be described, we were fully aware of the possible occurrence and danger of such an intermediate phase of relative susceptibility. It seemed to us, therefore, that, if an outbreak of diphtheria was to be brought under immediate and complete control, the only satisfactory way to prevent fresh cases from developing during the relatively susceptible phase was by protecting the children so far as possible from further risk of exposure to infection. This we proposed to do by detecting all carriers in the community and segregating them until the remaining children had acquired an adequate degree of active immunity.

Method of Controlling an Outbreak of Diphtheria

The method we adopted when it was evident that an outbreak of diphtheria in a school had begun was as follows:

1. Separate swabs were taken from the nose and throat of all children and teachers in non-residential schools and of the complete staff in residential schools. These were streaked on to a modified Horgan and Marshall tellurite blood agar, and diphtheria bacilli that developed were typed in the usual way. All strains of mitis and of intermedius type were uniformly tested for virulence to guinea-pigs, and a proportion of the strains of gravis type.

2. At the same visit all children were inoculated simultaneously into the left upper arm with 0.1 c.cm. of Burroughs Wellcome's alum-precipitated toxoid (A.P.T.) and into the right upper arm with 350 to 500 units of refined diphtheria antitoxin globulin (Pope, 1938, 1939) contained in about 0.1 c.cm. of serum. All injections were given into the deep subcutaneous tissue. The use of refined serum greatly lowers the incidence of serum rashes (Hutchison, 1939; Parish, personal communication, 1940).

3. All carriers were isolated or segregated as soon as the results of the swabs were known.

4. Four weeks later all children, including the carriers, were given 0.3 c.cm. of A.P.T. into the right upper arm.

5. All carriers were allowed to return to school two weeks after the second inoculation with A.P.T., but, though permitted to mix freely with the other boys and girls, they were forbidden, in residential schools, to participate in games with visiting teams. Any carrier who gave three consecutive negative swabs on tellurite blood agar before the end of the six-weeks period of segregation was allowed to return to school at once.

This general technique was adopted in seven outbreaks of diphtheria for which our help was sought. In the first three outbreaks it was modified by Schick-testing and swabbing the children at the first visit in accordance with the recommendation of Okell, Eagleton, and O'Brien (1924), and giving combined active and passive immunization three days later to the positive reactors. A single dose only of 0.3 c.cm. of A.P.T. was given to the negative reactors to serve as a stimulus to their antibody-producing mechanism. Preliminary Schick-testing was subsequently abandoned owing to the high proportion—75 to 90%—of susceptible children usually met with in the non-residential type of school population with which we later had to deal and to the waste of time involved. Not only did it necessitate an extra visit for the immunizing staff, but it meant the loss of three days in protecting the children at a time when they were most likely to develop infection. Another modification concerned the typing of the diphtheria bacilli, which was not undertaken as a routine in the early outbreaks investigated.

Results

The following is a brief description of our observations on the individual schools:

Royal Merchant Navy School.—This is a boarding school for about 200 boys and 100 girls. Diphtheria broke out, mostly

* Part I, "Studies of Antitoxin Response in Normal Students," appeared last week

of the nasal type, in October, 1939. By the beginning of December, 1939, when this laboratory was consulted, some 20 cases had occurred. All the children, as well as the teaching and domestic staff, were swabbed. Schick tests were carried out on the children, but not on the staff. Three days later the Schick tests were read: 58.4% of the children proved positive. With one exception all the Schick-positive children, the children in the hospital and sick bay, the domestic staff, and many of the teaching staff were given 400 units of antitoxin and 0.1 c.cm. of A.P.T. The second dose of 0.3 c.cm. of A.P.T. was given four weeks later. The swabs revealed 21 carriers of virulent diphtheria bacilli; 12 of these were carrying in the throat, 6 in the nose, and 3 in both throat and nose. These carriers were isolated for six weeks—that is, two weeks after the second injection of 0.3 c.cm. of A.P.T. Eight weeks after the second injection the children were re-Schicked. A conversion rate of 97% was recorded. The 3% of children who still reacted positively were given a third dose of 0.3 c.cm. of A.P.T. Two cases of diphtheria occurred after the first visit of the laboratory staff. One was in a boy who was removed from school by his parents without being immunized. The other, which was extremely mild, occurred in March, 1940, in a girl who had entered school in January with a history of having just received one immunizing injection of an undisclosed antigen at home. She was given 0.3 c.cm. of A.P.T. at school six days after her first injection. The interval between the two doses was presumably too short to enable an adequate degree of immunity to develop.

Turner's Court Training Colony.—This is a training colony for males between the ages of 14 and 24, and contains some 300 pupils. At the time of the first visit of the laboratory staff in December, 1939, at least 6 cases of diphtheria had recently occurred, one of which had proved fatal. Owing to the age of the boys, the whole colony was Schick-tested; 36% of the total were Schick-positive. The positive reactors were given 350 units of antitoxin and 0.1 c.cm. of A.P.T., followed four weeks later by 0.3 c.cm. of A.P.T. Nose and throat swabs which were taken at the first visit from all the boys revealed the presence of 11 carriers of virulent diphtheria bacilli. Six of these were carrying in the throat and 5 in the nose. The carriers were isolated for six weeks, but were not treated in any way. The pupils were re-Schicked eight weeks after the second injection. The conversion rate was 97.7%. The two boys who still reacted positively were given a third dose of 0.3 c.cm. of A.P.T. Two cases of diphtheria occurred subsequent to our first visit. One was, a few days after Schick-testing, in a boy whose immunizing record was defective; the other was in March, 1940, in a new boy who had entered the colony in the meantime without being immunized.

Chadlington and Spelsbury.—In these adjacent villages in Oxfordshire 22 cases of diphtheria were reported between January and November, 1939. All except three were in school children. Twenty of the cases had occurred at Chadlington, where the school population was about 120, and two at Spelsbury, where the school population was about 50. Closure of the school at Chadlington on three occasions for a considerable time had failed to prevent the occurrence of further cases. In November, when this laboratory was called in, Schick-testing was carried out on all the available school children, and nose and throat swabs were taken; 76% of the children proved to be Schick-positive. These children, together with those who had not been available for testing, were given 350 units of antitoxin and 0.1 c.cm. of A.P.T. The parents of 13 children refused immunization; these children were therefore excluded from school, together with 3 who were found to be carrying virulent diphtheria bacilli—2 in the throat and 1 in the nose. The school was reopened as soon as the carriers had been isolated. A second dose of 0.3 c.cm. of A.P.T. was given one month later to those children who had received a first dose. No cases of diphtheria occurred in either village after the beginning of immunization. Of the children who had been immunized 87 were re-Schicked ten weeks after the second dose of A.P.T., and a conversion rate of 96.5% was recorded. The two positive reactors were given a third dose of 0.5 c.cm. of A.P.T.

Chippenham.—In a day school containing over 400 children 7 cases of diphtheria occurred within a single week in the middle of October, 1940. The school was visited at once. Nose and throat swabs were taken from 360 of the children, all of whom were given 500 units of antitoxin and 0.1 c.cm. of A.P.T. No fewer than 27 carriers of virulent intermedius type of diphtheria bacilli were found—22 nasal, 4 throat, and 1 nose and throat. These were excluded from school for six weeks. Four weeks after the first visit the children were given a second immunizing dose of 0.3 c.cm. of A.P.T. Only one case of diphtheria occurred subsequent to our first visit, and that was in a child who had left the school without being immunized.

Lyneham and Tockenham.—In these two small adjacent villages in Wiltshire 9 cases of diphtheria, 2 of which were fatal, occurred between October and December, 1940. The school population numbered about 100. In the beginning of January, 1941, the children were given 500 units of antitoxin and 0.1 c.cm. of A.P.T. At the same visit nose and throat swabs were taken. Six carriers of the virulent gravis type of diphtheria bacilli were found; 3 were nasal, 2 were throat, and 1 was both nose and throat. These children were excluded from school for six weeks. Four weeks after the first immunizing dose the children were given a second dose of 0.3 c.cm. of A.P.T. No further cases of diphtheria occurred.

Leafield.—Two cases of diphtheria occurred in this Oxfordshire village. One was in an evacuee school child in August, 1940; the other was in a local child in November, 1940. Swabs were taken on November 11 and 15 from 170 children and staff, with the result that 22 carriers of diphtheria bacilli were found, all of the virulent mitis type; 4 were nose, 13 throat, and 5 nose and throat. Though cases of clinical diphtheria had been few, it was decided, owing to this high carrier rate, to give combined active and passive immunization to the children. This was done on November 20, when 0.1 c.cm. of A.P.T. and 500 units of antitoxin were injected. Since hospital beds for the isolation of the carriers were not available, these were kept segregated during school hours in a single classroom and forbidden to play with the other children. Two weeks after the second immunizing dose of 0.3 c.cm. of A.P.T., which was given on December 18, they were allowed to return to their normal school routine. No further cases of diphtheria occurred. The failure of this outbreak to assume epidemic proportions in spite of the high carrier rate is of some interest.

West Wycombe.—In August, 1940, 4 cases of diphtheria occurred within a week in the local school. On Monday of the following week the school was visited. Nose and throat swabs were taken from 120 of the children and staff, and the children were given 0.1 c.cm. of A.P.T. and 500 units of antitoxin. Nine carriers of the gravis type of diphtheria bacillus were detected—1 nose, 6 throat, and 2 nose and throat. The carriers were isolated. A second dose of 0.3 c.cm. of A.P.T. was given a month later. No further cases of diphtheria occurred.

Discussion

The results described in these seven outbreaks of diphtheria are very promising. With one possible exception, a boy whose immunization record was incomplete, there was not a single case of diphtheria after the first dose of A.P.T. and serum, whereas at least four cases occurred in children who for one reason or another had not been immunized. It is of course impossible to say what would have happened in the absence of our intervention, but the fact that in two outbreaks several cases had occurred in the previous week, and that in five of the outbreaks a large number of carriers were detected, renders it probable that in some at least of the schools cases would have continued to develop.

The problem created by the intermediate period of relative susceptibility, discussed briefly in the introduction to this paper, appears to have been satisfactorily solved by the detection and segregation of the carriers in the community. Permitting them to return to school a fortnight after the other children had received their second dose of A.P.T., even though they were still carrying the diphtheria bacillus, was admittedly hazardous, but in practice it did not lead to the development of any fresh cases in immu-

nized children. Two cases did occur, however, in children who either had not been immunized at all or had been imperfectly immunized.

It seems clear that if carriers are to be allowed to return to school in six weeks the remainder of the school children should in the meantime have been adequately treated. With the active co-operation of medical officers of health, such as we have been privileged to enjoy, there should be little difficulty in ensuring that all, or practically all, the children are immunized. If for any reason this proved impossible, either the carriers or the non-immunized children would have to be kept out of school, depending on which was the smaller group.

Judging from Fjord-Nielsen's (1940) observations on guinea-pigs, it is possible that a greater and more rapid degree of immunity might be obtained if a second dose of A.P.T. was given two weeks after the first combined injection, and a third dose a fortnight later. This would necessitate an extra visit for the immunizing staff, but it might render safe the liberation of the carriers within four instead of six weeks. No data, however, are available on this point, and it would be wise to make careful observations on the antitoxin production of non-contacts treated by this method before applying it to the control of epidemics in the field. Meanwhile, in view of Glenny, Buttle, and Stevens's (1931) observations, it would probably be sound practice, in order to ensure a greater amount of unneutralized toxoid remaining after the first injection, to increase the first dose of A.P.T. from 0.1 c.cm. to 0.3 c.cm.

It is curious that the method we advocate in this paper —namely, the use of active and passive immunization, and the detection of carriers and their isolation for six weeks—does not seem to have been employed previously, though each has been tried by itself. Ramon (1940), for example, states that the treatment of diphtheria contacts by combined active and passive immunization has been used extensively in France, but he mentions nothing about the detection and isolation of carriers, nor does he give any record of the results obtained. Gierthmühlen and Voges (1939) used the method of combined active and passive immunization in a school epidemic near Hamburg, but as they likewise paid no attention to possible carriers it is not surprising that a number of cases developed after passive immunity had worn off and before active immunity had become sufficiently established. Martin, Loiseau, and Laffaille (1928) used combined active and passive immunization for 14 school contacts, but again they did not attempt to remove the carriers. Okell, Eagleton, and O'Brien (1924), on the other hand, recommend the isolation of carriers but rely exclusively on active immunization of the Schick-positive contacts. The weakness of this method consists in wasting time over the Schick test and in affording no protection to susceptible children who are already infected or who contract infection before the carriers are removed. It would seem that if an outbreak of diphtheria is to be stopped at once, and that if further cases developing from exposure to infection after passive immunity has worn off are to be prevented, both combined active and passive immunization and the detection and isolation of carriers are necessary.

Summary and Conclusions

A method is described for bringing outbreaks of diphtheria in closed or semi-closed communities to an abrupt end.

The method consists essentially in (*a*) giving combined active and passive immunization to all those exposed to risk, and (*b*) detecting and segregating carriers of the diphtheria bacillus. Preliminary Schick-testing is neither necessary nor desirable.

The doses used in our work were 0.1 c.cm. of Burroughs Wellcome's A.P.T. and 350 to 500 units of refined diphtheria antitoxin for the first injection, and 0.3 c.cm. of A.P.T. for the second injection, four weeks later. It might be advisable, however, in future to increase the first dose of A.P.T. to 0.3 c.cm. and to give 500 units of antitoxin as a routine. Refined serum is advisable, because of the low proportion of serum reactions that follow its use. Carriers are immunized in the same way as the other children.

Six weeks after isolation—that is, two weeks after the rest of the school has received its second immunizing dose —the carriers can be liberated and allowed to mix freely with the other children, even though they are still infective. All new-comers must be immunized before entering the school or be kept segregated till they have been immunized.

This method was used in seven residential and non-residential schools in which diphtheria had broken out. The population at risk was about 1,500. In every instance the outbreak ceased immediately. Only five fresh cases are known to have occurred subsequent to the first combined injection: three of these were in children who were not immunized, one was in a child that did not receive its second dose of A.P.T. after four weeks, and one was in a child whose immunization record was defective.

These results are very promising, and it is hoped that other workers will give the method a trial. The fact that the children are protected at once by virtue of the serum injected renders closure of the school quite unnecessary. The saving of time, money, and inconvenience thus effected is too obvious to need stressing.

In outbreaks involving so many different administrative authorities it is impossible to accord due recognition to all the medical officers, head masters, health visitors, and school teachers who helped us. We should, however, like to mention particularly Dr. Campbell, M.O.H., West Oxfordshire Combined Districts; Dr. Rose of Wokingham; Dr. Warburton of Wallingford; Dr. Tangye, County M.O.H., and Dr. Blackley, Assistant County M.O.H., Wiltshire; Colonel Powell, M.O.H., borough of Chippenham; and Dr. Moore, M.O.H., borough of Chepping Wycombe. We are also greatly indebted to Miss D. M. Elliott for her care and help in keeping the records, and to our chief technician, Mr. J. D. Atkinson, whose forethought and continual watchfulness in arranging for the necessary provision of equipment cannot be praised too highly.

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According to the *Klinische Wochenschrift* (May 5, 1941), large quantities of rose-hips, the vitamin C content of which is ten times that of lemons, have been collected in Bulgaria. Roughly seven times the quantity gathered in the same period in Germany was obtained for Germany by a common organization in the two countries. The hips were dried, ground, and packed in Bulgaria, and were sent to Germany to be prepared for consumption. During the months of April and May the hips are to be distributed for sale among selected towns in accordance with instructions issued by the Reich Ministry of Health and the Reich Ministry of Food. Half of them will be given to the troops in Norway and sailors of the fleet, who are in special need of vitamin C, and the hospitals will also receive some.

INDUSTRIAL MEDICAL SERVICES IN GREAT BRITAIN

A CRITICAL SURVEY

BY

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Problems of 1914-18

It is an interesting fact and a sidelight on British mentality that the significance of industrial health and its relative importance in the scheme of things has been generally appreciated only when the country has been in a state of extreme emergency—namely, in the great war of 1914-18, and again in the present war. At the end of 1915 an unparalleled health problem was created because of the massing together of large numbers of munition workers—very many of them women—their abnormal hours of work, the intensive speeding up of production, and labour unrest generally. Fatigue became a primary cause of absenteeism and definitely interfered with the war effort, and the Government was therefore forced to take action. Lloyd George set up what he termed the Health of Munition Workers Committee "to consider and advise on questions of industrial fatigue, hours of labour, and other matters affecting the health and physical efficiency of workers in munition factories and workshops," and the results of its investigations are reported to have done much to improve conditions. This committee was replaced at the end of 1918 by the Industrial Fatigue Research Board. The Board is responsible to the Medical Research Council, which in turn is under the control of the King's Privy Council. An account of the work of the committee and the Board, known from 1928 onwards as the Industrial Health Research Board, has recently been published (Vernon, 1940) with particular reference to present-day health problems in factories.

Developments after 1918

Much of the pioneer work of the Health of Munition Workers Committee was either forgotten or disregarded after the war, and a general apathy developed on the part of both employers and organized labour regarding health matters. Academic research was continued by the Industrial Fatigue Research Board, but these efforts were rarely translated into practice. With trade revival in 1923 and during the next three or four years a number of the larger firms in England developed their own medical services—for example, Boots Pure Drug Company, the Chloride Electrical Storage Company, the Mond Nickel Company, J. Lyons and Co., and Imperial Chemical Industries Limited. By 1927 the number of whole-time industrial doctors was probably about 20 in all, including those employed by the General Post Office (Bashford, 1938), and Woolwich Arsenal, two large Government-owned industrial concerns which for many years before 1914 had whole-time medical officers. There was a gradual increase up to 1935, when the demand for contact and mutual help between doctors doing this type of work resulted in the formation of the first British scientific society in connexion with industrial medicine—the Association of Industrial Medical Officers. This association soon increased its membership, and the subject of health in industry began to take its place as a specialized branch of medicine, due largely to the pioneer work of Howard Mummery, Lane, and Lockhart; a branch which soon proved to link up closely with the work of the general practitioner and hospital specialists, and to be in its turn but a part of social medicine and the practice of public health. Regard must also be had to the work of Hyde and the Industrial Welfare Society in this connexion. His efforts from the earliest days did much to forward the case for industrial medical services in this country.

Developments in this War

In September, 1939, there were some 60 whole-time industrial medical officers in England and, so far as is known, only one in Scotland, but it was not until the introduction of the Factory (Welfare and Medical Services) Order of July, 1940—a direct result of the appointment of Ernest Bevin as Minister of Labour—that industry and the medical profession both realized that the Cinderella of our health services had been given a place in the front rank. Since then there has been a rapid development, and it is estimated that to-day there are over 150 whole-time and probably over 500 part-time medical officers employed by industry in Great Britain, practically all of them in factories. Many of the part-time doctors are also factory examining surgeons (the number of whom is over 1,750), who are appointed by central Government under the Factories Act mainly to examine all juveniles under 16 years of age entering factories and to give certificates in connexion with industrial diseases.

A similar impetus to industrial nursing was given by this Order. Not only have employers had to appoint medical officers but even more frequently they have had to appoint nurses. The Ministry of Labour, acting in collaboration with the Royal College of Nursing, has undertaken the training of nurses wishing to enter industry, and has advised that factories making new appointments should, wherever possible, employ fully trained State-registered nurses. This is an advance of some significance, replacing as it does the old conception that any woman could become a capable factory nurse simply by practice. The scope of the industrial nurse's work is gradually widening, and in the smaller units in particular—i.e., those employing fewer than 1,000 persons—her sphere is becoming more closely associated with preventive medicine and public health.

Why is there a Need for Industrial Health Services?

The term "industrial health" is not confined solely to a state of bodily and mental fitness in the individual, but includes what is really the state of the public health in groups of employees, both small and large. Productive capacity and output are dependent on health, and the economic status of any country is therefore closely related to the physical and mental well-being of its workers. The present health services of Great Britain—namely, the National Health Insurance Scheme, the fields of general and consultant practice, hospital services, and municipal and Government health services—do not cater fully for industry, because they have not given enough consideration to the varying physical and psychological factors within factories and business organizations which can so profoundly affect health. There are therefore in the nation's health service certain gaps which can be bridged only by the appointment of industrial medical officers and by the formulation of a comprehensive industrial medical policy as part of the general health services of the country. The more important of these gaps are as follows:

1. The First Treatment of Men and Women Injured or becoming Sick while Actually at Work

Hitherto this part of treatment has been mainly in the hands of persons with doubtful qualifications, first-aid workers of all types, and untrained nurses. Even where fully trained nurses are employed there is often no medical supervision of their work, and incidentally this is probably the only branch of nursing in which there can be a complete absence of medical

control. Because of this, casualty and first-aid services in industry have developed slowly and unsatisfactorily. For example, over 11% of all injuries reported* to the Factory Department in 1939 were septic. This is due not only to a lowering of individual resistance to infection and to carelessness in reporting so-called trivial injuries but also to the comparatively low standard of equipment required by the Factories Act, and the absence of any standard of treatment except a statement (Section 45) that the person carrying out this work in factories employing more than 50 persons shall be "a responsible person trained in first aid." The present first-aid organizations in Great Britain do not cater specially for this type of training, but the British Medical Association has considered the matter constructively and in some detail in a special report (1939).

Where a medical officer and trained nurses are appointed to a firm it has been proved that there is an immediate return to both the employer and the employee through the marked increase in the efficiency of the first treatment services. One proof of this is the reduction of sepsis that can rapidly be brought about (Stewart, 1939).

2. Medical Supervision of the Return to Work of Sick and Injured Employees

Sick and injured workers are often sent back to their jobs too soon and in a state of sub-fitness which for some considerable time makes it difficult for them to be really efficient; and, again, it may be that the doctor keeps a man or woman off work too long, and for that reason earning capacity is interfered with and production unconsciously retarded. The fact is that the majority of medical men and women have a scanty knowledge of the physical and mental requirements of the occupations of their patients: the return to work is determined by rough-and-ready hit-or-miss methods, and rehabilitation in the fullest sense of the term is a closed book to a great many of them.

The industrial medical officer who acquires an extensive and accurate knowledge of the different occupations in his industry can be of great help to medical practitioners and hospital authorities in assessing capacity for work. His part in rehabilitation is as essential as that of any occupational therapy clinic, and proof of this lies in the fact that where an industrial medical officer is employed the process of return to work is facilitated, to the greater satisfaction of both the worker himself and his employer. There is an opportunity for continued supervision under working conditions, of obtaining true alternative or "light" occupation during the toning-up process, of giving supplementary treatment in the factory clinic while the man is at work, and of obtaining for the workman a degree of indulgence from his supervisor for a short period which is so essential in completing rehabilitation. In any scheme for the setting up of accident hospitals, such as that already started at Birmingham, the position of the industrial medical officer as an essential part of the service must not be overlooked.

The implications of this side of his work are wider than is perhaps realized at first. During illness the patient consciously or subconsciously wishes to maintain some contact with his employer because of an inherent sense of insecurity, and particularly so if illness is prolonged, because there are limits to which financial assistance can be given, even if based on insurance methods; and so the industrial medical officer can be of assistance not only to sick and injured workers but to general practitioners, specialists, and hospital officers as their medium of contact with the employer on behalf of their patients. Because of his neutral position he can conserve a certain balance between employers and labour, and by so doing can build up good will and make a contribution of importance to industrial relationships.

3. The Effect of Working Environment on Health in Relation to Preventive Medicine

Because the medical profession knows so little of what goes on inside industry it becomes imperative that knowledge gained in the field of industrial medicine should be widely disseminated and the fullest facilities for education and research made available to the medical profession. The unique opportunities now afforded to many hundreds of doctors for preventive work within the factory walls will be wasted for future generations if some scheme of co-ordination is not evolved. Practical research into the prevention of accidents, industrial diseases, and sickabsenteeism generally, all offer scope for the best brains of the profession on economic grounds alone, apart from the value to the individual worker and the health of the nation.

Much research work, which before this war was of its kind outstanding in the world of scientific medicine, has been carried out by the Industrial Health Research Board. This work has included studies on hours of labour; environmental conditions in the factory, such as lighting, heating, and ventilation; dusts and toxic vapours; and the physiology and psychology of work. Each annual report in itself is a comprehensive document, and the individual reports on these various subjects are unique in their respective fields. Nevertheless there has been the greatest difficulty in having the results of the Board's investigations put into actual practice in British industry—a difficulty which the Board itself has recognized. It may be that terms of reference preclude it from propaganda and advertisement, but it is more urgent now than ever before to form some policy which will enable the results of health research work from all sources to become embodied as an essential part of industrial management. For example, industry should have some authoritative statement at an early date regarding the vexed questions of the use in industry of vitamins, physiotherapy, and inoculation in the prevention of the common cold and its derivatives, generally accepted to be the most frequent cause of sick absence in factories.

The Factories Act (1937) is a document of great significance. Its trend and appeal are towards an improvement of health; and as a contribution to preventive medicine its potential importance has perhaps as yet not been fully realized. Suggestions regarding medical supervision of factories are laid down in a pamphlet recently published by the Ministry of Labour (1940), which also will repay close consideration. And how industrial health is influenced by war conditions is described in an emergency report of the Industrial Health Research Board (1939). But perhaps the fullest account of the position in the country before September, 1939—an account not only of industrial health but of the British health services as a whole—is contained in a comprehensive report published by Political and Economic Planning in 1937.

The B.M.A. Medical Planning Commission, set up recently to consider the present and future development of Britain's health services, will undoubtedly have much to do with industrial health, especially with its relation to other branches of medicine. The suggestions of the Commission are to be fully considered at every stage by the profession as a whole, for it is only by the help of open and frank constructive criticism from all parties that any comprehensive scheme to meet the needs of the community can be evolved satisfactorily and put into practice.

What is the Nature of the Present Service?

Our present industrial medical services are mainly in factories and are for the most part voluntary in nature, medical officers being appointed and paid by the employer. There is no control, therefore, either by the medical profession itself or by the State, over the development of this type of service. The efforts of individual factory doctors have done much to improve health in industry, but mainly in the larger firms which could afford the service; and because of the lack of a suitable propaganda medium these benefits have often not been fully available for the great mass of workers.

* A "reportable" accident is one which has caused an absence from work of three days or more. (See Annual Reports of the Chief Inspector of Factories.)

There has been only a sporadic attempt to arrange for any training of the many new medical officers appointed to factories, nor is there any provision for education in the health problems of mines, the transport industry, or shipping. With the exception of London and Manchester the universities have done little to help. Birmingham University in 1935 set up a Department of Industrial Medicine, which for a number of reasons was closed in 1938; and because of the demand from individual doctors Manchester, Birmingham, and Sheffield Universities have within recent months organized successful week-end courses of training. The methods of selection and appointment of new industrial medical officers under the present system are open to criticism. Salaries and conditions of appointment vary greatly, and some general practitioners obtaining part-time appointments do so without much interest in industry; nor, with the responsibilities of a large general practice as their major problem, have they the time to develop this work.

The main way in which the State has come into the picture is because firms have been recommended and in some cases forced to appoint whole-time and part-time industrial medical officers by the Factory Department of the Ministry of Labour under the Factory (Medical and Welfare Services) Order, acting on behalf of the Minister of Labour. The Department has no say in how these services should be developed, but has given suggestions in the Memorandum on Medical Supervision in Factories already referred to.

The Factory Department itself has on its staff thirteen medical inspectors under the supervision of a senior medical inspector. These doctors are grouped regionally and supervise the statutory aspects of health in the 250,000-odd factories throughout the country. They work in close liaison with the lay inspectors, and have been helpful both to medical officers entering industry and to employers who have had to introduce medical and nursing services into their factories. Because of their extensive knowledge and experience of factory conditions they play an important part in the prevention of occupational diseases, and much of the success in eliminating these diseases from British industry in the past fifteen years has been due to their efforts.

The Ministry of Supply has since the start of the war set up its own medical service under a Chief Medical Officer, who is responsible for the administration and policy of the health services for all Government-owned factories in the control of the Ministry. Already he has under him 50 whole-time and a large number of part-time medical officers situated in various parts of the country, so what is really the first State-controlled medical service in the history of British medicine has now been set up, and its development will be watched with considerable interest.

The Mines Department has only one medical inspector, but a number of colliery owners and insurance companies interested in compensation problems among miners—for example, accident treatment and silicosis—have appointed their own doctors to supervise health conditions in mines. The Silicosis and Asbestosis Board is a body of doctors grouped regionally and appointed primarily to examine suspected cases from the point of view of capacity for work and compensation claims, but its individual members have been of considerable help to employers in the prevention of these diseases in industry.

Medical officers of health have little to do with health in factories, although it is a significant fact that local authorities are themselves often large employers of labour. The Ministry of Health has so far taken little part in industrial problems, being forced by circumstances to leave the matter largely in the hands of the Factory Department of the Ministry of Labour.

Relation of Industrial Medical Service to General Practitioners and Hospital Services

This relation was the subject of considerable controversy during 1935 and 1936, and a special committee of the British Medical Association was appointed to discuss the matter. As a result a set of ethical rules was drawn up by both sides, and these on the whole have operated satisfactorily from that time. In 1940 the Association appointed an Industrial Health Committee "to further the co-ordination of industrial medical practice with other forms of medical practice, in particular with general practice and the public health and hospital services," and its first report will be issued shortly.

Relations between general practitioners and industrial medical officers throughout the country are good, particularly in the case of whole-time medical officers. Where part-time medical officers who themselves are also general practitioners are employed there is evidence that relations are not always fully satisfactory or of the happiest. This is particularly noticeable where the part-time works doctor has an appointment in his own area and where he may unconsciously attract members of the works and staff of his factory to his private practice. The question of part-time medical service in industry is one of importance and must be closely considered in planning for the future, because a large proportion of the working population is employed in units of 250 or less. There is one view which suggests that industrial medical service after the war should be linked up with general practice, and another which maintains that an industrial medical service should be set up consisting of specially trained personnel who would devote the whole of their time to this type of work.

Hospital authorities have so far given little consideration to the effect of work and working environment on their patients' lives, especially in relation to the rehabilitation of the sick and injured. Schemes are on foot for improving conditions in hospitals with particular regard to the treatment of accidents, and a memorandum drawn up by the Birmingham Accident Hospital (1941) for industrial concerns in the Midlands brings out some of these points very clearly.

The Worker's Point of View

During the past ten years there have been complaints from individual workers and from organized labour about the employers' methods in connexion with the medical examination of workers. It was strongly felt that factory medical officers were essentially on the employer's side because they were appointed and paid by him; that they therefore had a biased outlook; and that if a man was found by medical examination to be unfit for certain work and this was disclosed to the employer, it would lead in many cases to injustice being done and in the end outweigh all the potential value of industrial medical services. But when the doctor understands the problem of relationships and has a reasonable outlook, and when he is fearless in his statements and gives opinions founded on accurate facts and observations, his position is soon recognized by employer and employees alike to be that of one entirely uninfluenced by the vested interests of either party, and his opinion is fully accepted by both sides in any matters to do with health. It is only by obtaining this bilateral confidence that the industrial medical officer can be successful in his work.

The Employer's Point of View

There are many employers in the country to-day who fully agree with the introduction of industrial medical ser-

vice and have welcomed its increase. They realize the economic value of such service and acknowledge that they have a responsibility in management beyond that of being merely custodians of the shareholders' money. This outlook is encouraging and provides greater reason for confidence that the service must have a place of no little importance in any future health planning for the nation. On the other hand there are still employers of labour who consider that the health of their employees is little or none of their business; they are prepared to fulfil the letter of the law and keep their statutory obligations, but are unwilling to go further. Where doctors are appointed under the new Order to such firms they have a great responsibility. They have to prove to the employer that the service they are giving is helpful not only to the workers but to industry as a whole, and one not lightly to be discarded after the war.

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"ETHER CONVULSIONS"

BY

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"Ether convulsions" were described simultaneously in May, 1927, by two Manchester anaesthetists—K. B. Pinson (1927) and the late S. R. Wilson (1927). Pinson thought them to be due to an over-accumulation of CO_2. This explanation has never been generally accepted, for not only have convulsions occurred during endotracheal administrations, when the alveolar CO_2 content is at its lowest, but the administration of CO_2 has been found an effective method of treatment. Wilson, on the other hand, attributed the convulsions to impurities in the ether, aldehydes and peroxides having been detected in the samples used. Walton (1928) found impurities which supported Wilson's theory, but Sykes (1930) and Ross Mackenzie (1931) did not find them, or only in such minute quantities as to be negligible. This theory, however, received much attention both from the chemical houses producing ether and from the makers of anaesthetic apparatus. It became customary to sell ether in dark-coloured bottles wrapped in black paper, and the ether bottles of some anaesthetic apparatus were made of heavily tinted glass. Later, copper was found to be a powerful anticatalytic agent, and the tubes which dip into the ether in Boyle's and similar machines were subsequently made of this metal. In spite of these precautions convulsions still occurred, and it has long been generally accepted that impure ether could not be regarded as their cause. Conclusive evidence of the correctness of this view is the fact that typical "ether convulsions" have occurred when no ether has been used—for example, during operations under local (Hudson, 1936), chloroform (Bull, 1927), and nitrous-oxide-oxygen anaesthesia (Sington, 1927).

When the convulsions were first described it was uncharitably suggested that these new and extraordinary phenomena might be due to faulty provincial technique. As reports were published of similar convulsions having been seen in all parts of the country this explanation had quickly to be abandoned, but, as will appear later in this paper, I consider the frequency with which they have occurred in Manchester to have a definite aetiological significance.

Since Pinson and Wilson first described this condition much has been written on the subject. Many case reports have appeared and numerous theories have been advanced, though none of them has been universally accepted. This is possibly because no one theory has explained and fitted in with all the known facts and the many observations that have been made. It is common knowledge, however, that the combination of youth, heat, and a septic condition with pyrexia occurs in some 85% of cases, and on this account the heat-stroke theory, first put forward by Dickson Wright (1935) and upheld by Woolmer and Taylor (1936), has received more support than any other. It is proposed in the present paper to support and elaborate both this theory and that of neurogenic shock advanced by Hudson (1936) and to explain the occurrence of the hyperpyrexia.

I suggest that ether convulsions are caused by a strong neurogenic stimulus in a hyperpyrexial patient. I consider that the hyperpyrexia is due to the administration of a general anaesthetic to a dehydrated pyrexial subject in a hot humid atmosphere, the subsequent rise in temperature possibly being increased by the previous administration of atropine.

Neurogenic Stimuli

In the cases recorded in Hudson's valuable paper the convulsions were undoubtedly initiated by neurogenic stimuli. This is equally true of a case reported verbally to the Anaesthetic Section of the Royal Society of Medicine. The last-mentioned patient was being given nitrous-oxide-oxygen for a thyroidectomy and had been premedicated with omnopon-scopolamine. The surgeon pulled rather hard to expose the upper pole, and convulsions started immediately. These settled in a minute or two, the operation was continued, and the surgeon repeated his over-forceful manœuvre, whereupon the convulsions immediately restarted.

The exact stage of the operation at which convulsions began has unfortunately not been mentioned in all the published case reports. In the majority of those in which it has been recorded one cannot but be struck by such oft-recurring phrases as "just as the peritoneum was being opened" or "while the peritoneum was being shut"—i.e., while the peritoneum was being lifted upwards, possibly rather forcibly. Again, in two or three cases bone chiselling was taking place at the moment of onset. I have seen one case in which convulsions started the moment the peritoneum was picked up by forceps previous to incision. The convulsions were controlled and the operation continued. The convulsions restarted when the peritoneum was picked up again as a preliminary to closure. I have seen another case in which the convulsions definitely started just as cross-action peritoneal forceps were applied. Yet another case of mine showed this initiating nociceptor factor even more dramatically.

The patient, a boy aged 8, was suffering from an acute mediastinitis due to a swallowed pin, which had passed through the oesophagus. He was extremely ill, was badly dehydrated,

and had a temperature of 103.8° F. I gave him nitrous oxide, oxygen, and ether from a Boyle machine via a Magill tube. The posterior mediastinum was opened under very light anaesthesia. The surgeon saw the pin at the bottom of the wound and turned round to choose a suitable instrument with which to extract it. Meanwhile his assistant unfortunately inserted and pulled on a deep retractor. The boy's pulse immediately halved its rate, and within a few seconds he experienced typical violent generalized convulsions.

It must be emphasized that it is not considered that neurogenic stimuli alone will cause convulsions. Every year thousands of patients receive gross peritoneal and other nervous insults without showing any alarming symptoms. But in the presence of hyperpyrexia, whether or not a general anaesthetic has been given, severe neurogenic stimuli are apt to initiate convulsive symptoms, though admittedly the latter very occasionally may occur without the patient having received any sensory stimuli—e.g., before the start of the operation.

The nature of the underlying biochemical change associated with the hyperpyrexia and predisposing to convulsions is not at present understood, though in this connexion the alteration of the wave-and-spike electrical activity of petit mal resulting from changes in blood-sugar concentrations (Gibbs, Gibbs, and Lennox, 1939) is of interest and worthy of further study.

Hyperpyrexia

There is a considerable volume of evidence in the literature that hyperpyrexia is present in patients who have had ether convulsions. I can add to this record two cases in which I found rectal temperatures of 108° and 108.5° F. immediately after short convulsions.

The possible factors leading to this hyperpyrexia must be carefully considered. In a typical case of ether convulsions the patient is 5 to 15 years of age and is suffering from an acute septic condition—often an acute appendicitis of forty-eight hours' standing. He has a raised body temperature and the weather is hot. All these factors, with the common addition of vomiting and reduction in fluid intake, combine to cause a severe degree of dehydration.

It was considered in the past that simultaneously with a rise in the skin temperature of the extremities (Scott and Morton, 1931) a fall in body temperature occurred under ether anaesthesia. Watkins and Wilson (1927) showed, however, that this was true only of quiescent-interval cases, and that in acute cases in dehydrated subjects body temperature rose during ether anaesthesia. I have repeated, and confirmed, the latter observation on a series of patients.

I have found that a dehydrated subject with a temperature of, say, 101° F. who is given a general anaesthetic is, particularly if young, likely, under the best conditions as regards theatre ventilation, to return to the ward with a temperature about 2° higher. If theatre conditions are not optimal his temperature may rise considerably more. The association between hot weather and ether convulsions has often been noted. As has been mentioned, hot weather can exert an influence by increasing the patient's pre-operative dehydration. It can also raise the temperature of old-fashioned theatres. The temperature of the theatre is not, however, of very great importance *per se*. It is the wet-bulb temperature and the relative humidity which matter. Hamilton Bailey (1940) recently cast doubt upon the heat-stroke theory when reporting two cases which occurred in extremely cold weather. Without a record of the wet-bulb temperatures of the theatres this observation does not carry much weight.

On two occasions I have been able to measure the wet-bulb temperatures of theatres immediately after ether convulsions had occurred, and found readings of 78° and 79° F., the latter being only 1° F. less than the temperature at which, under Board of Trade regulations, cotton factories must be evacuated. Every degree rise in wet-bulb temperature reduces the amount of heat which the body can lose. It follows that if a dehydrated pyrexial young subject is anaesthetized in a hot humid theatre the expected rise in temperature of 2° to 3° F. may be greatly exceeded. I would suggest that this is the reason why Manchester has seen such a regrettable number of ether convulsions, the prevailing humidity being notorious.

In this connexion it is interesting to note that no case of ether convulsions has occurred in any of five busy air-conditioned theatres in that city since they were built six years ago.

Atropine

Hornabrook (1927) first suggested that large doses of atropine were the chief cause of ether convulsions. Sington (1927) rather refuted this idea on the evidence of the Hospital for Sick Children, Great Ormond Street, where 7,000 children are operated on each year and where all receive large doses of atropine. While there is no evidence that atropine ever acts directly as a convulsive agent in these cases, as Hornabrook suggested, but rather the reverse, it is possible that it does contribute to the hyperpyrexia.

Observations were made on the effect of atropine on the rise of body temperature which occurs in a hot atmosphere with a high-percentage saturation of moisture. Three subjects sat for twenty minutes in a room of a Russian bath. When they had cooled down again each was given 1/60 grain of atropine subcutaneously. Half an hour later they sat for another twenty minutes in the Russian bath. Their temperatures on the different occasions are given below:

	I	II	III
Before experiment	97°	97·4°	98°
After 20 minutes in Russian bath	100°	100·4°	100·2°
Return to normal	97°	97·6°	98°
After 20 minutes in Russian bath 1/2 hour after injection of atropine	100·6°	101·3°	101·3°

These results showed that the very hot humid atmosphere caused a slightly greater rise in body temperature after the administration of atropine. Incidentally the atropine also caused a very marked and unpleasant exaggeration of the subjective symptoms.

Treatment

Acceptance of these theories opens up a definite line of treatment which must primarily be preventive. This dangerous complication can be very largely averted, and particular care should be taken to remove the exciting factors in those subjects in whom the onset of the condition might be feared.

1. The dehydrated pyrexial young patient should be put on a glucose-saline drip before operation, and anaesthesia should not be induced until at least 1 to 2 pints have been given.

2. All new theatres should, of course, be air-conditioned. Apart from this, much may be done to improve existing theatres by the use of extractor fans, air vents, steam condensers, removal of sterilizers outside theatres, and similar steps. A wet-and-dry-bulb thermometer should be found in every general theatre, and an anaesthetist should normally refuse to induce a dehydrated young patient if the wet-bulb temperature is over 70° F.

3. It is unnecessary to emphasize here the importance of gentle surgery and of avoiding neurogenic trauma. So far as the anaesthetist is concerned, he should see that the depth of anaesthesia is always adequate for the stage of the operation in progress.

4. Heavy mackintosh coverings should not be used.

5. The patient should be intubated immediately if the anaesthetist feels that convulsive symptoms are at all imminent.

I do not consider that atropine should be withheld, providing the other and more important points have received attention.

Active treatment should be as follows if a convulsion occurs despite precautions:

1. If an inhalational anaesthetic is being given it should be discontinued immediately and O_2 and CO_2 administered.

2. All coverings should be removed from the patient. The limbs should be sprayed with cold water (a stirrup pump is excellent for this purpose) and evaporation hastened by air currents from waved towels, oxygen cylinders, etc.

3. The table should be placed in a slight reverse Trendelenburg position.

4. If, as often happens, convulsions cease temporarily in a minute or so, the patient should be intubated if this has not already been done.

5. If convulsions have not ceased in this time a *small* intravenous dose of a barbiturate should be given. In practice this means that a nurse or student should prepare some pentothal or evipan on the first sign of a convulsion and that it should be given as soon as it is ready if the convulsions are still in evidence.

6. If the patient has not been intubated this must be done immediately the barbiturate has controlled the convulsions sufficiently to make it possible, and rhythmic insufflation with oxygen must be performed. *This is most important.* Barbiturates can and will save lives in ether convulsions, but they can also cause fatal respiratory paralysis. A case of ether convulsions which ends fatally usually does so with a cyanosed patient and a tonically contracted larynx. A barbiturate given shortly before this stage is reached—and it may occur within as little as a minute or two of the first symptom—may check the convulsion, but there is a danger that respiratory movements may never begin again unless pulmonary ventilation is artificially performed from the earliest possible moment.

7. If the stage of the operation demands further anaesthesia with relaxation, ether may be restarted or continuous barbiturate anaesthesia may be substituted. The ether is only one of the several contributing factors which go to initiate a convulsion, and, especially in unskilled hands, a change over to chloroform may well do more harm than good.

Differential Diagnosis of Ether Convulsions

Many writers have emphasized the difference between convulsions and ether clonus, a harmless though annoying complication which appears early and usually disappears as anaesthesia deepens. There is, however, another type of movement which I have seen on a number of occasions, but which is not mentioned in the literature—namely, regular rhythmical movements of one or more muscle groups, usually occurring early in the third stage and soon passing away, but occasionally persisting into deep anaesthesia. I have seen these movements affecting a single finger, a hand, a foot, a knee, and on one occasion the head. Movement occurs in relation to respiration, usually every third or fourth breath. None of the patients showing these movements was at all inconvenienced by them or was the least source of anxiety to me. No treatment was necessary. I mention them because on two occasions I have known house-surgeons see these movements affecting the eyebrows and mistake them for the irregular premonitory twitchings which so often herald convulsions.

Summary and Conclusions

It is suggested that ether convulsions are caused by neurogenic stimuli in hyperpyrexial patients.

It is shown that hyperpyrexia will result from the administration of general anaesthesia to a dehydrated patient in a hot humid atmosphere.

Logical methods of preventive and active treatment are described.

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ENCOPRESIS (INCONTINENCE OF FAECES) IN CHILDREN

BY

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The term "encopresis" was suggested by Weissenberg (1926) for those cases of faecal incontinence in which no definite organic lesion is found. As a shortened description, and the counterpart of "enuresis," it is perhaps worthy of adoption. The condition has not had the attention it deserves compared, for example, with enuresis, and receives scant mention in textbooks of paediatrics.

Although encopresis is much less common than enuresis, it is certainly more distressing, and is often, too, a symptom of severe neurosis. The fact that the child will "grow out of it" is no reason for not hastening the process of cure, particularly at the present time, when the condition is fairly prominent among problems of evacuation. The complaint cannot be classified simply under one heading, for it varies from mere soiling, diurnal or nocturnal, to those cases in which there is not only incontinence but also playing with faeces—decorating the bed or the wall, or depositing the scybala in out-of-the-way places. An attempt is here made to describe some of the cases observed at a child guidance clinic and followed up long enough to see the outcome of treatment or of the lapse of time.

Cases of incontinence of faeces may be divided into: (1) simple soiling, (2) neurotic cases, and (3) cases associated with petit mal or vasovagal conditions. Partial soiling of bed or trousers must be distinguished from the passage of formed scybala either involuntarily or semi-voluntarily. The former may be due to sheer hastiness, carelessness, or lack of training. Again, it may be due to fear of asking to leave the room, fear of a dark lavatory or passage, or simple lack of enough leisure in a badly managed home. There is, of course, no sharp dividing line between these cases and those in which there is an element of neurosis.

Reports of Cases

The following case illustrates treatment by child guidance methods, chiefly play therapy, and also the environmental factors involved.

A girl aged 12½ was referred to the child guidance clinic from hospital, where she had been an in-patient under observation. The incontinence had started about three years previously and had occurred by day and by night. No physical abnormality was found. She was also stated to have tempers and to walk in her sleep. She was the eldest of three girls, and had shown intense jealousy of both her sisters. The father was given to drink, and has twice left home owing to rows with his mother-in-law.

The patient was a normal baby, though difficult to train. At the age of 6 she sustained slight concussion, and when 8 was

twice in hospital for "chorea" (the diagnosis is doubtful). Her intelligence is slightly below the average. She is pleasant, friendly, inclined to moodiness and temper, and normally sociable, but looks pale and tired. She made twenty-two attendances at the clinic during February to May, 1938. The incontinence stopped a few weeks after she started treatment, and she began to look cleaner and brighter. Her play showed a conflict of feelings of various kinds, such as inferiority and self-assertiveness; jealousy, together with the inhibition of natural aggression; and sex curiosity. She was able to understand through her play how the opposing sides of her personality were causing profound maladjustments towards both her family and herself.

As the home situation could not be altered and she was "outgrowing her strength," it was decided to give her a year or so at a residential open-air school. Later on, after leaving school, she had a difficult period owing to conditions at home, but managed to survive it.

In this case incontinence was evidently a form of aggression against an intolerable home situation.

When prolonged into adolescence the condition is especially distressing to the patient, particularly in girls. The following case illustrates a probable association with suppressed sex curiosity and desire:

A girl aged 15 was referred for wandering and staying out at night; she was said to go out with soldiers and to spend nights in air-raid shelters. She suffered from faecal incontinence, which occurred only when she stayed out late in the evenings. She was the younger of two daughters, the elder one being the model girl. The parents were a mixture of hardness and sentimentality. With friendly interest at the clinic the incontinence stopped, and an attempt was made to get her away to suitable training.

The association of this symptom with sexual maladjustment or sexual "habits" is understandable as a regression to early sex development, and particularly the fantasy association between the process of birth and defaecation. This appeared to be vividly illustrated in the following case:

A girl aged 8 was referred to the child guidance clinic by the head teacher with the story that the child deposited her faeces in odd places, such as a corner of the school cloakroom, and, moreover, arranged scarves, bits of wool, etc., like a nest around them. The child, who lived alone with her mother, had recently discovered that a new baby was expected. The mother was in bed, and the girl was naturally having a difficult life. As something had to be done urgently, arrangements were made to get her away for a time. It was subsequently found that she had been unwanted; the mother was a very unreliable person, and the father worse. The complaint stopped as soon as the child got away from home into happy friendly surroundings, but she was described as a bit "queer" and not making friends easily. Unfortunately, owing to frequent changes of address, the case could not be followed up.

The association between the feelings of this child, unwanted (as later events proved) and expecting the advent of a rival, and the attempt which she made symbolically (as well as very realistically!) to give birth herself to something, which she treated as though it were a baby, appears fairly obvious.

The next case is one in which the condition, also associated with depositing faeces in curious places, yielded surprisingly quickly to removal from home for a short time.

This case was that of a boy aged 10 in whom the trouble had arisen only eighteen months previously. His incontinence was accompanied by various methods of disposing of the faeces—by plastering the walls, putting them in his pocket, etc. The situation at home was that he had a second stepmother, who was well-meaning but neurotic and disagreed with the father over the boy. There was a younger stepbrother (the son of the first stepmother), of whom the boy was jealous. He was of average intelligence and had a good school report. The complaint ceased when he was boarded out on a farm. A few weeks later the parents took him home on some trivial excuse, but the trouble did not recur, and he was well when seen a year later.

Finally, here is a case illustrating an association of faecal incontinence with attacks of what may probably be described as pyknolepsy.

A boy aged 11 was referred from hospital in April, 1938, for enuresis and faecal incontinence. He was free from both while in hospital for two weeks. His father is normal; the mother has migraine. He was born after a gap of seven years, and has four older sisters and one younger brother. He had always had enuresis and was spoilt as a baby. He began soiling his trousers when he started school, and was smacked at first.

"Turns" which resembled petit mal began three years ago, and now occur frequently during the day. He is backward, and his intelligence is below the average. He is shunned or teased by other children. Soon after starting attendance at the clinic the enuresis stopped, and two months later the incontinence also stopped. His play showed much repressed aggression, and the world was to him a place full of danger. He remembered being tied down in his pram as a baby.

He relapsed, and spent some time at an open-air school, but did not sustain the previous improvement. No apparent reason was found for these relapses, and attempts to gain the further co-operation of the parents have failed.

Aetiology

Encopresis is primarily a psychogenic disorder. It is a physical symptom which appears, in response to certain psychological situations, in children who are in some way constitutionally predisposed to the particular response. Apart from the aetiological factors constantly found in the environment, proof of its psychogenic nature is furnished by the cessation of the complaint when psychological means such as reassurance, explanation, alteration of environment, etc., are applied. It is, generally speaking, a protest against an inimical and threatening environment: an unconscious reaction, both of aggression and of fear. The details of the mental mechanism and fantasies involved, though of great interest from the psycho-analytic point of view, are too complex for discussion here.

With regard to the physiology of the condition, it would seem as though the emotional tension operated by cutting out the voluntary control of the excretory mechanism and reducing it to a spinal reflex. It would be, in this sense, a hysteric mechanism of dissociation.

In all such psychosomatic symptoms it is obvious that, however predominant a part the psychological side may play, physical aspects and measures must not be neglected. Some cases of apparent incontinence, for example, are more in the nature of lienteric diarrhoea, while others may actually need treatment for constipation. It is a fact, however, that most cases are associated with normal evacuation.

Treatment

The treatment may be summarized as follows. Whereas full psychological treatment at a clinic may be desirable, it is often not obtainable; but all measures are in a sense psychological.

1. An inquiry by the doctor into the child's background, habits, etc., may reveal something which needs to be put right—e.g., the child may be worrying over school. The doctor who has an intimate knowledge of the family should score in this respect. Advice may be accompanied by medicine both for its actual effect (e.g., pulv. cretae) and as a vehicle for suggestion, if its properties are emphasized to the child and parent. Some of the cases, however, are actually constipated, and this must be carefully inquired into.

2. As regards psychological treatment, this will follow the usual lines of child guidance. Direct treatment aimed at removal of the symptom, by suggestion or other means, is, in my opinion, desirable in many cases, as it eases the situation considerably for both parent and child, and further treatment can be carried on for the neurosis as a whole. This will generally be in the nature of play therapy, depending on the technique employed. In adolescents, vocational guidance is usually necessary, as well as readjustment of their attitude to their problems. It must be pointed out, however, that prolonged treatment is not required in all cases. For many of them the symptom can be cured in two or three interviews or by simple environmental readjustment.

3. Very good results can be obtained in an institution provided it is of the right type. A residential open-air school has cured some of the cases first seen at the child guidance clinic. Others are cured at hostels for evacuated children. Everything, however, depends on the good relation between staff and children. At the school mentioned above remedial exercises to strengthen the abdominal and pelvic muscles were considered useful.

4. If simple measures fail a period of observation in hospital may be advisable, both to eliminate organic disorder and because it may effect a salutary break, and show the child and the parent that the habit can stop (just as asthmatic, epileptic, and other attacks often disappear while the child is in hospital.

Summary

An inquiry is made into the investigation and treatment of encopresis in children based on cases treated at the Birmingham Child Guidance Clinic over the past seven years.

No definite organic condition is found, and the cause is held to be psychogenic, the symptom being a regressive one.

Examples of cases and a summary of various lines of treatment are given.

My thanks are due to Miss A. McClure, Miss T. Alcock, and Dr. S. Isaacs for their observations and suggestions.

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MACROCYTIC ANAEMIA FOLLOWING GASTRO-ENTEROSTOMY

BY

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The following two cases seem to be of some clinical interest. Both men developed a macrocytic anaemia after gastro-enterostomy. The first had had an operation for duodenal ulcer eleven years ago, and now shows a hyperchromic macrocytic anaemia which coexists with the hyperacidity of the gastric juice. The second patient developed a severe hyperchromic anaemia with some features of pernicious anaemia after a gastro-enterostomy performed twenty-eight years ago. He recovered without incident after liver therapy. Owing to the long time since the operation it is impossible to state definitely in this latter case if the present anaemia arose in connexion with the previous operation or if it is a separate entity.

Case Reports

Case 1.—A miner aged 52. Eleven years ago he was operated on for duodenal ulcer, a posterior gastro-enterostomy being done. The fractional test meal before the operation showed hyperacidity. Since then he has had little trouble, only occasionally having slight attacks of pain; lately, however, the pain has been worse, and is accompanied by vomiting. On examination pallor of the skin, a slightly enlarged spleen, and tenderness in the epigastrium were found. A radiograph revealed a normally functioning gastro-enterostomy with some ulcer deformity in the duodenum; there was no ulcer crater. Fractional test meal: fasting juice volume 40 c.cm.

	Fasting	½	1	1½	2	2½	3 hrs.
Free HCl ..	35	10	40	45	35	25	25 } N/10 NaOH
Total acidity ..	45	25	55	55	55	45	45 } as % of HCl

Blood examination showed: red cells, 1,630,000 per c.mm.; haemoglobin, 40%; colour index, 1.25; macrocytosis; white cells, 10,000 per c.mm.—polymorphs 69%, eosinophils 4%, basophils 1%, lymphocytes 14%, monocytes 12%. Sternal puncture showed the bone marrow to be normal. Liver (pernaemon) was given with good result.

Case 2.—A railway constable aged 62 complained of weakness and breathlessness on exertion. In 1912 a posterior gastro-enterostomy was performed for duodenal ulcer. Examination showed pallor of the skin, slight glossitis, sluggish knee- and ankle-jerks, but no enlargement of the spleen and liver. The fractional test meal showed no free HCl, the total acidity not exceeding 10; the fasting juice volume was 50 c.cm. Blood examination: red cells, 1,500,000 per c.mm.; haemoglobin, 55%; colour index, 1.8; macrocytosis; white cells, 3,000 per c.mm.—polymorphs 49%, eosinophils 6%, lymphocytes 42%, monocytes 3%. Normoblasts 7 per one hundred white cells; reticulocytes 2 per thousand. The fragility of the red corpuscles against hypotonic NaCl. solution was normal—0.36 to 0.46%. Sternal puncture revealed an excessive number of large erythroblasts. Liver (pernaemon) was given, and three weeks later examination of the blood showed a great improvement

Commentary

The development of a hypochromic anaemia following simple gastro-enterostomy for gastric ulcer has been noted by many authors. This type of anaemia was reported by Witts (1930) in four cases, by Cosin and Hurst (1930) in one case, by Davies (1931) in five women and one man, by Lublin (1936) in 23 cases, by Meulengracht (1932) in one case, and by Hartfall (1934) in six women.

There are also much rarer reports of hyperchromic anaemia, sometimes called "megalocytic" anaemia, developing after gastro-enterostomy. Davidson (1928) described an Addisonian anaemia developing twenty months after gastro-enterostomy; Conybeare reported such a case in 1922; Hurst (1934) collected seven cases; Lublin mentioned this type of anaemia in one case two years after operation; and Fairley and Kilner (1931) reported one case of megalocytic anaemia following gastro-jejunostomy which eventually developed gastro-jejuno-colic fistula. Lastly, Salus (1932) reported two cases of subacute combined degeneration of the cord, without anaemia, fifteen years after gastro-jejunostomy.

The period in which the cases developed anaemia varies considerably—from twenty months to twenty-eight years after the operation. For the most part the anaemia occurred in women. Vaughan (1932) and others have stated that the anaemia may coexist with hyperacidity as in Case 1 above. They found normal acidity or hyperacidity in a certain proportion of cases after gastric operation even if severe anaemia was present.

The diagnosis of pernicious anaemia in the above cases is based on the blood picture (megalocytosis, colour index,

and diameter of red corpuscles), on the common physical signs of pernicious anaemia, and on the good results of liver therapy. Nevertheless not all these cases have the convincing features of true pernicious anaemia, and it would be preferable to speak of macrocytic anaemia. This condition may be due to two causes: first, it may be a lack of intrinsic factor as found in a typical case of pernicious anaemia; secondly, it may be that owing to artificial interference with the flow of the intestinal contents the extrinsic and the intrinsic factor are unable to unite and be absorbed in the normal manner.

Our thanks are due to the late Dr. Alexander Goodall for his permission to record these cases.

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Medical Memoranda

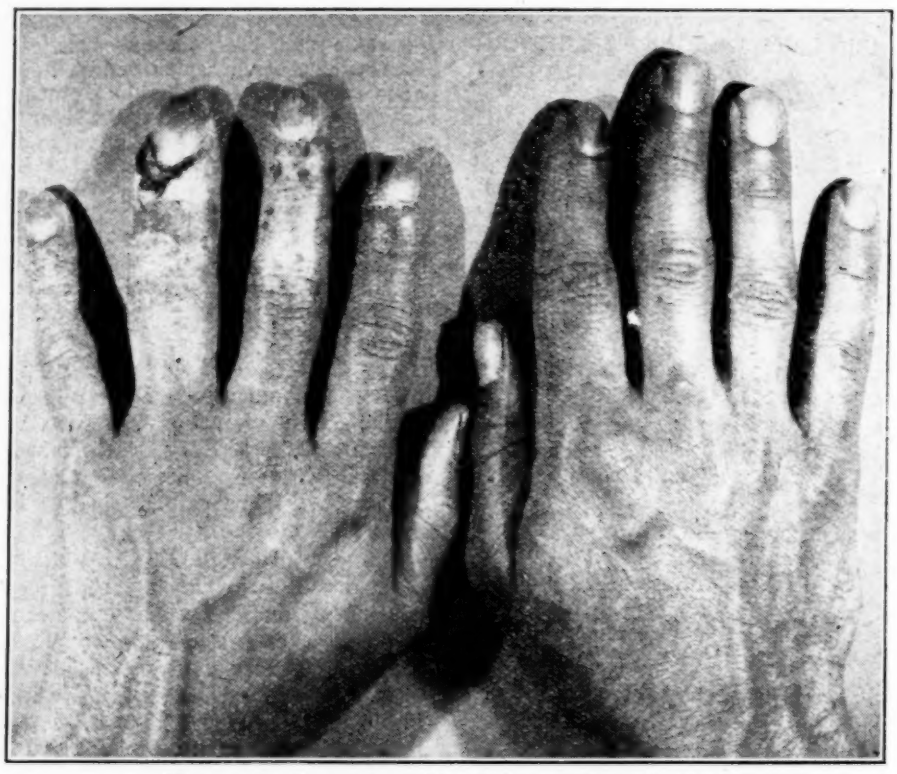
A Case of X-ray Dermatitis

We think the following case should be given wide publicity to avoid a repetition of the catastrophes of the early days of radiology. Since the outbreak of war many new *x*-ray machines have been installed and operated by untrained or inexperienced persons who are ignorant of the dangers to which they are exposed. There is also an increasing tendency for orthopaedic surgeons to reduce fractures under screen control, either operating the apparatus themselves or permitting some untrained member of the theatre staff to do so. The case quoted shows that such proceedings are not without risk and may be followed by serious, even disastrous, consequences. The proper method of screen examination as practised by radiologists entails a minimal exposure of the hands, and there is no risk to the operator. The enormous number of screen examinations performed daily by radiologists all over the country for many years without untoward result is conclusive proof of the safety of the proper method.

CASE REPORT

A doctor aged 26 recently consulted us about treatment for *x*-ray dermatitis which he had contracted over a year ago at a hospital in another district. In April, 1940, he began reducing fractures under screen control, averaging one daily. Soreness gradually developed in the fingers of the left hand and by June, 1940, there was a well-developed erythema affecting the dorsal surfaces of all four fingers as far down as the middle of the proximal phalanges. This progressed to blistering, followed by desquamation and loss of the nails. Healing took place in three or four months, but several sets of nails developed only partially before a permanent set resulted.

In March, 1941, the left fourth digit became reddened and oedematous, and in June an ulcer developed. On examination there was marked oedema of the finger. It showed general reddening and there was an ulcer near the base of the nail on the ulnar side. The ulcer was about the size of a sixpence and is continuing to spread. Constant severe pain was present, radiating up the ulnar nerve and requiring drugs to produce sleep. The skin of the other fingers was thin, dry, and delicate, with many small reddish-brown subcutaneous areas. The nails were normally formed, but thin and brittle. The left thumb and right hand appeared normal.



Photograph of *x*-ray dermatitis. Taken by ultra-violet light.

Photographs were taken by artificial light, ultra-violet light, and infra-red light by Mr. C. H. Edlin of Nottingham, to whom our thanks are due. The ulcer is clearly seen and the subcutaneous spots are particularly well shown on the ultra-violet photograph, appearing as black spots (see Fig.). We were rather surprised that the infra-red photograph gave much less information than the other two.

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Reviews

WILLIAMS'S OBSTETRICS

Williams's Obstetrics: A Textbook for the Use of Students and Practitioners. 8th Edition. By Henricus J. Stander, M.D., F.A.C.S., Professor of Obstetrics and Gynaecology, Cornell University Medical College. (Pp. 1,401; 704 illustrations; 13 plates. 55s. net.) London and New York: D. Appleton-Century Company. 1941.

Encouraged by the very friendly reception given to the revised seventh edition, for which he was responsible, Dr. Stander has now completed the eighth edition of Whitridge Williams's great textbook. Extensive alterations have been made. The text has been almost completely rewritten and there are three new chapters. These deal with diseases and abnormalities of the newborn, the classification of abnormal pelves, and sudden death and maternal mortality. The old chapters which have been rearranged include those dealing with embryology, the mechanism of labour, toxaemia of pregnancy, puerperal infections, and diseases of the urinary system. A comprehensive international bibliography given at the end of each chapter is invaluable for purposes of reference.

In its eighth edition this textbook still retains its place as the outstanding authority on obstetrics in the English language. As might be expected, however, in a work of its size, there are aspects in which its teaching could with justice be criticized. The statement that the only substitute for breast milk is cow's milk, because most infant foods are very defective, gives no recognition of the excellent results of scientific research that have provided methods of feeding which are both satisfactory and safe in circumstances in which the use of cow's milk would be dangerous. In view of the popularity of the lower-segment Caesarean section technique in many of the American clinics it is interesting to note that Stander believes that it is not a radical enough operation in cases of actual or suspect sepsis. If labour has been present for twelve hours or more, or if repeated vaginal examinations have been made, he holds that either the Porro operation or extraperitoneal section should be performed. The excellent results published by Marshall in this country, as well as the experience of many other operators, would suggest that on this point his teaching is too radical. Terminology on occasions is not strictly accurate: throughout the text "primipara" is used for "primigravida," and one reads of oblique and transverse presentations. Considerable detail is given concerning the immediate treatment of the asphyxiated babe, but the subsequent care and conduct of the "cerebral child" receive no mention. The book is lavishly illustrated and beautifully produced.

DIETETICS FOR THE CLINICIAN

Dietetics for the Clinician. By the late Milton Arlanden Bridges, M.D., F.A.C.P. Fourth edition, thoroughly revised. (Pp. 960. 45s. net.) London: Henry Kimpton. 1941.

When a textbook has reached a fourth edition the medical reviewer must treat it with respect, though he may feel much the same emotions as the literary reviewer in the presence of a popular best-seller. Bridges's *Dietetics* probably owes its success to the fact that the bulk of the text is devoted to diseases and their diets in alphabetical sequence from Acidosis to Xanthoma. The tired practitioner is thus enabled to cut the cackle and consult the appropriate section, to see, for example, how to treat a patient suffering from Poisoning from Spray Residues or Pruritus Ani. The appendix and the bibliographies, totalling over 300 pages, are a monument to the painstaking and valuable labours of the scientists who collected the data, the writers who compiled them, and the printers and proof-readers who have so accurately listed them. This section is as fascinating to browse on as a dictionary. A portion of "Corn, Sweet, med." is "100 grammes, one ear, 8 in./or"], and it contains 21.0 grammes of carbohydrate. The John Collins, so familiar to readers of American detective stories, is a mixture of Hollands gin, lemon juice, sugar, and seltzer. Chipped beef is sliced dried beef. The term "skimmed milk" is not acceptable; it must be "skim milk." What, then, are the criticisms? We have long known that man cannot live by bread alone, but after reading this book a man might well believe that little mattered but vitamins and minerals; for vitamins get over 50 pages, minerals and acid-base factors another 50 pages, and carbohydrates, proteins, fats, and lipoids only 10 pages of text. Some of the dietetic sections, again, are a good deal more dogmatic than accurate. It is surprising to be told, even on the authority of Moynihan, that in 75% of cases of gastric haemorrhage the aetiology has been proved to be extragastric; or that "the dietary procedure in gastric haemorrhage for the first twenty-four to forty-eight hours is not subject to much controversy, it consists in withholding all foods, whether fluid or solid"; or that fat intolerance from gall-bladder dyspepsia is at all common in haematemesis. But there are far too many gastric diets scattered through this book and some contradictory advice, so that in another section we are told that the Meulengracht diet is highly regarded for the management of bleeding peptic ulcer. And when, too, will a textbook of dietetics give us a reasonable review of the various dehydrating diets that have been used for the treatment of tuberculosis, rheumatoid arthritis, vertigo, and migraine?

In conclusion, we must beg leave to doubt whether this fourth edition of an expensive textbook of dietetics can play any part in the war effort in which the whole world is now engaged. The clinician and the dietitian of to-day must have a real practical knowledge of metabolism, food values, and food handling. They will not get it from this book, and the majority of the diets listed are now as inaccessible to our patients as convalescence in Switzerland or a trip to the Riviera.

WORK OF THE FACTORY NURSE

A Handbook for Industrial Nurses. By Marion M. West, S.R.N. With foreword by Sir David Munro, K.C.B. (Pp. 134. 3s. 6d.) London: Edward Arnold and Co. 1941.

This short book gives a good summary of many things about which the factory nurse should know. It is divided into sections dealing with factory legislation, the duties and qualifications of the nurse, first aid and medical supervision, the factory ambulance room, record-keeping, routine treatment, and the co-ordination of industrial health and welfare services. The book rightly stresses the importance of factory nurses receiving adequate training so that in turn they can assess the true value of health services in industry; and in the days when more nurses are entering industry than ever before it is reasonable that the aims and functions of this new branch of nursing should be clearly defined. Because of the great variety of work which may have to be carried out by factory nurses, varying in different factories from pure casualty work to a combination of nursing duties with advanced welfare supervision, it is extremely difficult to define the scope of this form of health service. On these points this book, while brief, is of very considerable assistance to the reader, and can be recommended both to those nurses already in industry and those who may be considering entering this field of work.

Notes on Books

Contraception: Its Theory, History, and Practice, as surveyed by MARIE STOPES, D.Sc., Ph.D., contains a great deal of information, not all of equal importance, upon the subject. In the preface to the fifth edition the pioneer's enthusiasm still shines. Peace is founded on contraceptive birth control, which is the only means of ensuring that love shall take control for every infant born. Contrast the coercion of motherhood by the three aggressor nations. Dr. Stopes has her preferences and gives good reasons for them. Nevertheless, the bulk of experience in municipal and voluntary contraceptive clinics is surely against her in their choice of a Dutch cap much more often than of her racial occlusive pessary; also in their satisfactory results from "Volpar" in spite of her alarm about its minimal content of Hg. Though no mention is made of a gold filigree ring as an improvement on Gräfenburg's silver one, the objections to all intra-uterine appliances are well stated. Perhaps because the book has so much personal interest, it would be spoilt for some readers by compression; but the value of recounting past controversies and ignorances becomes a little doubtful. To the majority of medical readers the possibilities of plastic repair operations, for instance, have become more important than those varieties of contraceptives designed for displaced or damaged parts. The book is published by Putnam and Co. at 15s.

Under the title *Allies of Life* the Church Missionary Society (Salisbury Square, E.C.4) publishes at 2d. a brief report of its medical work in Africa, the Near East, India, and China. Nearly 100 C.M.S. doctors and more than that number of nurses, together with their colleagues of other races (including fifty-nine doctors), are working in these fields. In Africa two pioneer efforts have actually been started since the war began—a new out-patient work in the Sokoto province of Northern Nigeria and the first C.M.S. hospital in the Yomba country, the southern portion of the vast Lagos diocese. Three C.M.S. hospitals in Palestine and one in Transjordan are doing valuable maternity and infant welfare work. In Iran the mission hospitals are increasingly appreciated by the Government. In the Moru district of the Southern Sudan 17 out-stations now bring medical facilities within reasonable reach. In India at Quetta a new hospital was opened last year, and another in Kashmir, where, Dr. Noel Fletcher remarks, osteomalacia is probably more prevalent than in any other part of India; out of 65 deliveries at the mission hospital in eight months, only 19 were normal. In China the C.M.S. hospital at Kunming, the chief Chinese city on the Burma Road, instead of being a distant outpost, is now a very important strategic mission centre. With the co-operation of the Shanghai Medical College it has become a teaching school.

Volume 13, No. 1 (June, 1941), of the *Index to the Literature of Food Investigation* has now been published by the Department of Scientific and Industrial Research at 4s. 6d. net. It is obtainable from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or through any bookseller. The *Index*, compiled by Agnes E. Glennie, B.Sc., assisted by Gwen Davies, B.A., and Catherine Alexander, B.Sc., is divided into fifteen sections and deals with the different classes of meat, poultry, fish, vegetables, and dairy produce, with grain and fats, and with canning, freezing and chilling, bacteriology, mycology, and engineering.

The calendar of the Royal College of Surgeons of England for 1941 (Taylor and Francis, Ltd., Red Lion Court, Fleet Street, 2s. 6d.) is necessarily stripped of much material to meet the acute shortage of paper; it has 226 pages, compared with 630 last year. All the current official information is given, but the introductory historical matter, the chronological and alphabetical register of Fellows, and the lists of Members, Licentiates in Dental Surgery, and of diplomates have been omitted. There is a roll of honour, recording the names of Fellows, Members, and holders of the L.D.S. who have been killed in action or have lost their lives from wounds or disease contracted while on active service during the present war.

Preparations and Appliances

REMOVAL OF PLASTER CASTS
A MODIFICATION OF BICKFORD'S METHOD

Major C. W. R. PRICE, R.A.M.C., writes:

About a year ago Mr. R. G. Bickford[1] described his method of removing plaster casts by incorporating piano wire in them. In practice at the Royal Devon and Exeter Hospital we found that it was a most difficult operation to hold simultaneously a limb with an unstable fracture and a springy length of wire while a plaster cast was applied. Secondly, when the time for removal came, the cut which the wire made was very narrow and a separator was required to break open the cast: impatience with the manœuvre readily led to broken finger-nails. This second objection could be met by incorporating two lengths of wire in the cast so that "bivalving" could be carried out. However, the application of a cast having two wires involved such fantastic dexterity on the part of the operator and his assistant that it was deemed impracticable. Our third dislike was for the use of stockinet as a lining for the casts. We did write to the makers for some of the wire backed by adhesive tape which Mr. Bickford suggested as an alternative to the use of stockinet, but had adopted the method which follows long before any answer to our inquiry arrived.

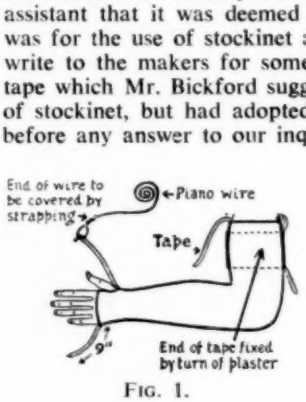

FIG. 1.

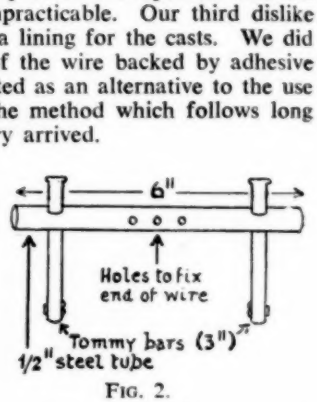

FIG. 2.

Ordinary cotton tape well smeared with vaseline is laid on the skin of the limb, either in the mid-line of its anterior aspect if only one wire is to be used, or on the inner and outer aspects, or fore and aft, if two wires are to be used. The tapes are about 18 inches longer than the length of the proposed cast, so that there is about 9 inches excess at its top and bottom. The tapes readily adhere by virtue of their vaseline coating and thus do not require to be held while the plaster is being applied. When the cast has been completed, any adhesion of the tapes to the inside of the cast which the vaseline coating has failed to prevent can be broken down and the ends of the tape can then be turned back and secured by a single turn of plaster bandage (Fig. 1).

When the time comes for removal, lengths of 24-gauge piano wire can be readily pulled into position by the tapes. For the actual twisting of the wire we use two "twisters" of the type shown in the sketch (Fig. 2). These are easily made from 6-inch lengths of 1/2-inch steel tubing, and one is used to fix an end of the wire while cutting proceeds from the other end of the plaster.

DESICCANT PASTE FOR THE SKIN

British Drug Houses Ltd. have now put on the market "siccolam," a desiccant paste containing titanium dioxide, zinc oxide, and small quantities of purified silicates in a fat-free base. This preparation of metallic oxides with dehydrating and anti-phlogistic effects on the skin was described by H. C. Semon and F. Herrmann in the *British Journal of Dermatology and Syphilis*, June, 1941 (p. 177). In the authors' experience "siccolam" proved, among many combinations examined for over a year, to be the most favourable application in the treatment of inflammatory dermatoses in which the use of fatty preparations was contraindicated. It is a dense creamy substance, drying rapidly when spread thinly over the lesions, and is supplied in collapsible tubes of 2 oz. and 4 oz. Other medicaments, such as tar or sulphur, can be incorporated at the physician's discretion.

[1] *British Medical Journal*, 1940, **1**, 539.

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PROTECTION AGAINST DIPHTHERIA

To combat the toxin which is harming a child suffering from diphtheria the physician must administer antitoxin instantly, and to this end he injects antitoxin ready-made in the horse. But the immunologist has long wished to induce the infected patient to manufacture antitoxin rapidly in his own body; thus two sources of attack would be directed against the toxin. The problem has been studied by two teams of workers in close concert with the Emergency Public Health Laboratory Service. A. W. Downie with one team studied the effects of the injection into one group of volunteers of diphtheria toxoid (A, the active immunization section), and of the simultaneous injection of diphtheria antitoxin and toxoid into a second group (A + P, active and passive immunization). F. Fulton with the other team used the A + P method in epidemics in schools. After a valuable review of the experience of previous workers it was difficult to avoid the conclusion that the antitoxin in the A + P method interferes with the primary response to the toxoid—that is, the immediate active immunization—but does not abolish the sensitizing influence which leads to the very rapid production of antitoxin when toxoid is administered at a later date. The correctness of this conclusion is the chief result of the careful research described in the pages of this and last week's issue of the *Journal*. Some 300 third-year medical and farm-training students were first Schick-tested while at the same time a sample of blood from each was taken for estimation of "natural antitoxin" content. About half of the Schick-positive individuals formed Group A and half Group A + P. In Group A (148) each received at once 0.1 c.cm. of A.P.T. (alum-precipitated toxoid) by subcutaneous injection, and those in Group A + P received the same dose of A.P.T. and also 350 to 500 units of diphtheria antitoxin into the other arm. A month later the blood of all students was titrated for antitoxin, and 0.3 c.cm. of A.P.T. was injected. From eight to twelve weeks later a third titration and a Schick test were made. Thus data were available which indicated the gradual excretion of the therapeutic diphtheria serum and the appearance of antitoxin produced in the student's body as the result of active immunization. In the A group the well-known minimal production of antitoxin was noted after the first injection, with a rapid increase after the second injection given a month later. In from twelve to sixteen weeks from the beginning of the observations 95.7% of the A group became Schick-negative. In the A + P group the general picture was the same, with the important difference that the production of antitoxin began much later and was then slower, the early delay being due to the therapeutic serum still present in the blood. By the end of the month this had fallen to one-tenth of its initial content. The A + P group probably reached maximum production of antitoxin a month later than the A group, but the level was not much different: 90.5% became Schick-negative.

A period of low immunity occurred in the A + P group during the first month, when the therapeutic serum had disappeared from the blood and active production of antitoxin was low. This period of danger was provided for in the management of epidemics in schools by Fulton and his team. The children in the seven infected residential and non-residential schools received a dose of 500 units of antitoxin as well as 0.1 c.cm. of alum toxoid. A month later the second dose of 0.3 c.cm. of alum toxoid was injected. During the period of low protection disclosed in the research on the students the children in the schools were protected from infection, for all carriers were isolated for six weeks, when it was assumed—and correctly as the event showed—that the A + P children were immune and safe even if still infected carriers were readmitted. In the schools, with a population of about 1,500, five cases of diphtheria occurred after the campaign started, but in none of the five had the full series of injections been given. Obviously, new children entering the school must be fully immunized. The method gave excellent results in the seven epidemics in the schools, and without doubt it will be widely adopted.

The team of eight workers would have put public health administrators even more deeply in their debt if they had discussed variations of the method which may be imposed by absence of laboratory facilities or other lack. In these distressful days one may have to combat an epidemic—for example, among masses of ill-fed refugees—far indeed from laboratory aid, with only antitoxin available. Here the familiar procedure is to give 500 units of antitoxin to everyone in contact with the infected persons. Virtually complete protection is thus assured for three weeks. So far as we can learn the earliest recorded attack of proved clinical diphtheria after the giving of antitoxin occurred eighteen days later. Thereafter antitoxin would be kept in reserve ready for instant administration to anyone observed during daily inspection to be showing any symptoms suggestive of diphtheria. As the death rate from diphtheria if adequate antitoxin is given in the first twenty-four hours is almost *nil*, such a method gives a high degree of safety. Before Park put active immunization against diphtheria on a sound basis this method of blockage by antitoxin worked fairly

well, but recurrences after the safety period of three weeks constantly harassed the physician. If some laboratory facilities are available, what is the best evolution of this simple method of using antitoxin? We do not know if the method favoured by the late Prof. Okell[1] has been applied on a large scale: this consisted of Schick-testing and swabbing all in the infected community. It was an interesting plan. He read his Schick reactions and the swabs at twenty-four hours and immediately began active immunization of the Schick-positive, swab-negative group. The members of the group would not develop satisfactory immunity for some few weeks—a danger period. This he met by keeping antitoxin available at each daily inspection. His dangerous carriers—the Schick-negative, swab-positive group—were immediately isolated, the aim being to allow the Schick-positive group to develop some immunity free from the danger of the carrier. It is possible, even probable, that Okell would have prescribed antitoxin at the first visit if the modern digest antitoxin, with its almost complete freedom from serum reaction, had then been available.

It is difficult to estimate the danger period in the method used by Downie, Fulton, and their colleagues. Of 116 people in the A group—that is, receiving active immunization only—82% at four weeks still had 0.001 unit or less of antitoxin per c.cm. of blood, and were probably liable to infection from any chance undetected carrier. Even eight weeks after the second dose of prophylactic 29% of the A + P group showed 0.001 unit or less of antitoxin, and only 12% in the A group; presumably both were still in the danger zone. But the proverbial pudding was good to eat, for the method gave brilliant results, and most administrators would plump for this instant insurance with antitoxin. Incidentally, the value to the medical students of this training in theoretical and practical immunology must have been indeed great.

A small comment is suggested by the recent paper of Bunch and others.[2] They found that almost 40% of Schick-positive medical students were sensitive to toxoid—one may say they were "pseudo-reactors." These people would suffer severe reaction if toxoid were used in the ordinary dose, but Bunch immunized them successfully by minute doses of toxoid intracutaneously or by a long series of a dozen or more gradually increased subcutaneous doses of toxoid, starting with a 1% dilution. As Downie and his colleagues eliminated from the tables the Schick-positive students with more than 0.001 unit of antitoxin per c.cm. of blood they probably excluded many of the people acutely sensitive to toxoid but nevertheless easily immunized.[3] It would have added one more to the many fascinating points in the report if the heavily "pseudo-reacting" had been dealt with in special tables.

The whole account of the research work published in our columns is a model of concerted and statistically controlled observation and its epidemiological application. The same Service will no doubt supply us with others.

[1] Okell, C. C., Eagleton, A. J., and O'Brien, R. A., *Lancet*, 1924, **1**, 803.
[2] *J. Immunol.*, 1940, **39**, 427.
[3] Fraser, C. J., *Amer. J. publ. Hlth.*, 1927, **17**, 1027.

CHEMOTHERAPY OF PROTOZOAL INFECTIONS

In 1937 Lourie and Yorke[1] showed that synthalin (decane diguanidine) exerted a powerful trypanocidal action *in vitro*, a concentration of only 1 in 100 millions sufficing to destroy all the trypanosomes in a suspension of nutrient medium within twenty-four hours at 37° C. This discovery of the direct trypanocidal action of synthalin, which was of considerable academic interest in view of the fact that the chemical constitution of synthalin is essentially different from that of all known trypanocidal substances, opened up a wide field of biological and chemical inquiry. With the chemical collaboration of Dr. H. King of the National Institute of Medical Research and of Dr. Ewins of Messrs. May and Baker, a large number of guanidines, isothioureas, amidines, and amines were prepared and their trypanocidal activity examined. Certain of the aromatic diamidines produced by Ewins were found to exhibit quite remarkable trypanocidal activity, single injections of a small fraction of the tolerated doses sufficing to cure infected laboratory animals. The most active were 4:4′-diamidino-stilbene, 4:4′-diamidino-diphenoxy-propane, and 4:4′-diamidino-diphenoxy-pentane. As Lourie and Yorke in 1939 found that some of these compounds also exhibited a curative action in *Babesia canis* infections of dogs, they were sent to Dr. Adler at Jerusalem with a request that he would ascertain whether they had any therapeutic action in hamsters experimentally infected with leishmaniasis; in due course Adler reported favourably. It was then decided to try the new compounds in man, and Adams and Yorke in 1939 administered diamidino-stilbene to a severe case of Indian kala-azar. The patient was apparently cured by a short course of eight daily injections of 1.0 mg. per kilo of body weight. Shortly afterwards in the same year Adler and Rachmilewitz reported the successful treatment of a woman infected with *Leishmania infantum* in Palestine, and, a year later, Adams and Yorke of a second case of Indian kala-azar.

In view of these successful preliminary results the compounds were sent to various workers in the field for more extensive clinical trial. In 1940 Napier and Sen in Calcutta tested diamidino-stilbene in eight patients with kala-azar, all of whom were apparently cured by a course of eight to twelve daily injections of 1 to 2 mg. per kilo. Kirk and Sati, in the same year, tried the compounds on a series of forty-nine patients with Sudan leishmaniasis, some of whom had relapsed after previous treatment with antimony. Forty-one of these forty-nine cases were discharged as provisionally cured; of the eight fatal cases, five of the patients were moribund when admitted to hospital and died after only a few injections, and one died after a debauch. As Kirk and Sati point out, these results compare very favourably with those hitherto obtained in the treatment of Sudan leishmaniasis with the antimonials. They write:

"The clinical picture of the uncomplicated disease is a grave one. Intractable diarrhoea, haemorrhages, and complications like cancrum oris and lobar pneumonia are frequent. Experience with antimony has shown that the

[1] See *British Medical Journal*, 1940, **1**, 410.

Indian standard treatment is inadequate in the Sudan disease, where the action of the drug is much slower. A larger total dose is usually required to effect a cure, and cases are frequently encountered which are completely resistant to any form of antimony treatment. Moreover, Sudanese kala-azar patients are very sensitive to the toxic effects of antimony, and the early attempts to treat the Sudan disease with this drug along the lines advocated in India led only to a series of disasters, which Archibald recognized as attributable to the drug rather than to the disease."

In view of the relatively great difficulty which has been experienced in curing Mediterranean and Sudan leishmaniasis with antimonials, it is not surprising that both Adler and Kirk found that much larger quantities of the diamidines were required in this form of leishmaniasis than in Indian kala-azar. The size of the individual dose given varied between 1.0 and 2.5 mg. per kilo of body weight, and apparently at least thirty injections were necessary to produce a cure. It is as yet too early to decide what value these compounds have in the therapy of human trypanosomiasis. Reports so far available indicate that they produce rapid peripheral sterilization, and that they cure early cases. Diamidinostilbene, which has hitherto been mostly used in cases of sleeping sickness, apparently fails to cure cases in a late stage with pronounced changes in the spinal fluid: but preliminary reports received from Lourie in Sierra Leone suggest that diamidino-diphenoxy-pentane and diamidino-diphenoxy-propane may prove more valuable than diamidino-stilbene in such cases. The therapeutic activity of these compounds in dogs infected with *Babesia canis* has been examined in Kenya and Uganda. In 1941 Daubney and Hudson in Kenya treated sixteen infected dogs—most of them pure bred—with diamidinostilbene, and cured fourteen with a single dose; two advanced cases, one of which was moribund when treated, were fatal. In the same year Carmichael and Fiennes, in Uganda, cured 102 of 116 infected dogs with a single dose of diamidino-diphenoxy-propane; ten relapsed, but were cured with a second dose, and four died. Carmichael and Fiennes conclude that this new compound has proved the most valuable drug they have so far encountered in the treatment of tick fever (*Babesia canis*) in dogs.

WAR PRODUCTION AND HEALTH

Because of the increasing magnitude of the national effort we are now as a nation faced with production problems which are unparalleled in history. Not the least of these problems is that of absenteeism. It is difficult for medical observers to know how much of absenteeism is due to ill-health, and therefore to what extent ill-health is responsible for the falling off in factory output which is reported to have taken place recently. In a few industries accurate statistics are available, but only in a proportion of these is the sickness record of the individual and his occupational group analysed critically with a view to the employment of preventive measures. Until we have a compulsory method of notifying factory absenteeism caused by sickness, just as it is now compulsory for employers to notify to the Factory Department accident cases that cause a loss of three or more working days, we cannot as a profession see the problem in its true perspective or give industry our optimum assistance. Prof. John Ryle has recently commented forcibly on the need for further inquiries into the human factor in its relation to war production[1] "if a true assessment of causes and effects is to be reached." The report of the B.M.A. on industrial medicine, now published and summarized elsewhere in this issue, backs up Prof. Ryle's appeal and emphasizes the need for both research and education in connexion with industrial health. These and other problems in industrial medicine are ably dealt with by Dr. Donald Stewart in an article at page 762.

The time has never been less propitious for resting on the laurels of research carried out during the last war or in times of peace. The work of the Industrial Health Research Board, which was based on accurate facts and observations at the time, must go on and must take cognizance of present-day factors, and in particular of the importance of propaganda. Factory accidents are increasing; the black-out has its own peculiar problems; the importation of labour to many industrial centres presents medical aspects of the greatest significance; and the ever-increasing number of women workers entering factories has become associated with many health problems, not the least of which is the possible increase in tuberculosis. Again, some authoritative statement is required on the supposed efficacy of vitamin therapy, ultra-violet therapy, and vaccination in the prevention of the common cold, generally accepted as the chief cause of absence from work. Some statement, if it can be given, is wanted now because both workers and managements are demanding guidance from the medical profession on the institution of positive preventive measures, and in the absence of this they are often proceeding on their own responsibility on "hit-or-miss" lines and without medical advice.

As a result of the Factories (Medical and Welfare Services) Order of 1940 the number of medical officers in factories has so increased that our profession is now well represented within the factory walls and ready to help. But how? The majority of these doctors have had but little training in their subject. Many of those newly appointed have had to find their own feet and work out their own salvation. And in these days of crisis how wasteful this has been! The facilities for education and practical help have been limited to sporadic week-end courses at three provincial universities—Birmingham, Manchester, and Sheffield—although there never was a better case for continuous assistance, possibly at week-ends, both in these centres and in London. The factory doctor wants advice and help from the best brains in the profession, and he wants it now. He needs it not so much on the treatment of injuries and the organization of casualty services—for which at least he has had some training—but rather in relation to the wider problems of the prevention of accidents and sickness among his workers, and to the need for linking up medicine with the social requirements of the community, which is the true basis for the maintenance of health in industry.

[1] *Times*, October 2, 1941.

THE STIMULANT ACTION OF IRON

Whatever may happen in animals, it is generally agreed that the normal human being absorbs large quantities of medicinal iron, even when all precautions have previously been taken to ensure adequacy of the reserves; two directly contradictory papers dealing with this point were presented at the last meeting of the American Society for Clinical Investigation.[1,2] During the last decade it has been assumed that iron acts as a nutritional element rather than as a drug. Helen Mackay,[3] at the beginning of this phase, had shown that the haemoglobin levels of artificially fed babies treated with iron surpassed those of breast-fed babies, and she had used the higher figures in the construction of a standard normal haemoglobin curve in infancy. In 1936 Widdowson and McCance[4] gave iron to a normal group of men and women and observed their haemoglobin levels. The women's haemoglobin tended to rise and approach the men's level; the men's haemoglobin did not change. This might have suggested that women normally have a mild but pathological anaemia. In 1938 Sankaran and Rajagopal[5] confirmed the fact that the haemoglobin content of the blood in healthy young females could be raised by the daily administration of ferrous sulphate, but they found that the haemoglobin returned to the original level when the iron was discontinued. Miss Widdowson[6] then showed that the administration of iron in therapeutic doses to pregnant women converted into a rise the fall in haemoglobin which was then in progress. After the administration of iron had been discontinued the haemoglobin fell once more, and at about the same rate as if iron had not been administered.

These observations have very seriously upset the view that the maximum haemoglobin levels which can be attained by giving iron to pregnant and non-pregnant females and to infants really are optimum or physiological levels. They are probably just as abnormal as complete saturation with vitamin C. Miss Widdowson suggested that one of the factors concerned in the level of haemoglobin in circulation is the amount of iron in the plasma: the administration of iron temporarily raises the level of plasma iron, which stimulates the marrow to greater activity. Such a stimulus is from the evolutionary point of view a highly abnormal one, as the intake of iron in the food is never such as to cause comparable rises in the plasma iron. The subject has been carried a stage further by Fowler and Barer,[7] who show that when medicinal iron is administered to normal subjects there is a gradual increase in the blood haemoglobin which reaches a peak in about ten to twelve weeks and then gradually falls to the pre-treatment level even though the administration of iron is continued. This is true whether the initial haemoglobin level was low normal or high normal, though in the latter the response is less marked. The work was apparently done on both males and females, but the effects are more noticeable in females, inasmuch as their haemoglobin level is more often on the low side of normal. A similar supernormal peak and subsequent fall to normal levels is observed during the successful treatment of hypochromic anaemia. What, then, is the student of nutrition to regard as the normal level of haemoglobin? It is certainly not a uniform level but a rather broad zone with considerable individual, sex, and age variations. It is the level found in a group of healthy people living on a good diet. The mere fact that a haemoglobin level can be temporarily raised by iron medication is no proof that it was initially abnormal, and unless we are to regard infancy and pregnancy as morbid states we must accept the view that the level of haemoglobin is normally lower at those times, perhaps for some good reason. In pregnancy, at all events, the circulation is much altered, and it may well be that the tissue tension of oxygen remains normal in spite of the depression in haemoglobin.

[1] *J. clin. Invest.*, 1941, **20**, 436.
[2] Ibid., 1941, **20**, 437.
[3] Med. Res. Cncl. Spec. Rep. Ser., 1931, No. 157, *Nutritional Anaemia in Infancy*, London.
[4] *J. Hyg.*, Camb., 1936, **36**, 13.
[5] *Indian J. med. Res.*, 1938, **25**, 753.
[6] *Lancet*, 1939, **2**, 640.
[7] *Amer. J. med. Sci.*, 1941, **201**, 642.

OCCUPATIONAL ACNE

Among the manifold skin lesions met with in industry, and clearly attributable to chemical causes, acne is relatively uncommon. So-called "oil acne" is not, we believe, the result of chemical injury. Where acne is already present a superimposed chemical dermatitis does not appear to aggravate the condition: the distribution is, in general, different, and the dermatitis may clear up, leaving the acne to pursue its course more or less uninterruptedly. While many hold that sufferers from acne are likely to have an increased tendency to industrial dermatitis, this probably applies only to certain exposures, and may, in the last analysis, be traceable to the coexistence of dirt and seborrhoea rather than to the acne. Typical acne, with its characteristic lesion, has for long been known as an industrial disease and referred to variously as "chlor-acne," and by the Germans as *Pernakrankheit* from its association with exposure to the fumes of perchlornaphthalenes. Inorganic chlorine compounds have been blamed as well as chlorine itself. A. Thelwall Jones, who has had much practical experience, does not believe[1] in the association of chlorine with so-called chlor-acne. Occupational acne among workers engaged in the manufacture of a host of chlorinated organic compounds is a disease almost unknown in one large firm in this country. Many of these compounds give rise to severe dermatitis, but acne does not occur. Many reports, however, have appeared on the acne which results from exposure to the fumes of chlorinated naphthalenes and chlorinated diphenyl, and Jones describes his own observations of occupational acne among workers engaged in the manufacture of these compounds. Alkyl derivatives of naphthalene with chlorine substituted in the side chain readily give rise to dermatitis, but never of the acneiform type. Thus there seems to be something very special about the action of chlorinated naphthalenes and chlorinated diphenyl. The view of Teleky in 1927 was that the effect on the skin was proportional to the chlorine content, and that much improvement was attainable if the chlorine content were diminished from 30% to 8%, the loosely bound chlorine being removed.

There are several points of great interest in these cases of occupational acne, and they are carefully described by Jones. There is a long latent period between the beginning of exposure to the fumes of these compounds and the appearance of the lesions; this varied in Jones's series from one month to two years, with an average of seven months. After proper treatment the acne may recur even after removal from exposure, and final disappearance may be delayed for anything up to two years or more, particularly if infection has become superimposed. The lesions in Jones's cases were most commonly on the face and behind the ears; a few occurred on the forehead, but the nose and mid-line of the face were spared; in severe cases the neck, chest, upper abdomen, arms and extensor surfaces of the forearms, the back, thighs, and buttocks may also be affected. As distinct from acne vulgaris there is in this condition a very large number of fine blackheads around

[1] *J. industr. Hyg.*, 1941, **23**, 290.

the eyes without the greasiness of the skin found in the former. Areas of skin where friction is likely to arise or which are not washed regularly are particularly susceptible; dirt in general is a predisposing factor, and Jones's worst cases occurred in workers of uncleanly habits. He suggests that the mechanism of production depends upon the solution of the chlorinated bodies in sebum; when not washed away the compounds irritate the sebaceous glands, stimulate the local growth of the stratum corneum and the secretion of sebaceous matter, and thus lead to blockage of the follicle with possible secondary infection. As opposed to the view of several other observers (Macleod among others) that chlor-acne results from absorption of the chemical through the respiratory and digestive tracts, with subsequent excretion through the pilo-sebaceous follicle, Jones believes that it is due to local external irritation, particularly as the effects are local and leave the rest of the skin untouched. Attempts to demonstrate an attack on the skin by direct application of the vapour of molten chlor-naphthalenes to human skin (back) were, however, negative. In view of the recent addition of poisoning by chlor-naphthalenes to the schedule of industrial diseases, it is interesting that Jones found no cases with obvious signs of hepatic disease. Nevertheless there can be no doubt, on the grounds both of animal experiment and of several human cases in the literature, that excessive exposure to these fumes leads to necrosis of the liver.

The recommendations the author gives for protection of workers engaged in the manufacture of these compounds follow well-recognized but often neglected principles. The trouble lies in part in the lack of co-operation and understanding by the workers. Jones's points are worth recording: (1) The worker must be taught the nature and course of the condition. (2) Overalls must be provided—light-coloured, highly starched, closely woven, full-length sleeves, and a proper neck. Full-length underwear should be laundered at least once a week. (3) There should be adequate locker accommodation. (4) The worker should avoid touching the body and the face with his hands; rags should not be used for wiping the nose or face. Washing should be enforced before meals, and no one should eat while at work. (5) Adolescents should not be employed, nor should men with seborrhoea or acne. (6) Frequent medical inspection is necessary, and early cases should be removed from further exposure. (7) No other work should be done which entails much sweating. No reliance can be placed upon "protective" creams in this hazard; the whole emphasis is on cleanliness and medical supervision.

A NEW TEST FOR INFLUENZA VIRUSES AND THEIR IMMUNE BODIES

The unexpectedness of research is one of its charms: the most unlooked-for things turn up. Hirst[1] was removing influenza A virus from developing chick embryos when he noticed that the red cells of the infected chick, coming from ruptured vessels, were agglutinated in the allantoic fluid. Since red cells in the allantoic fluid of chick embryos inoculated with sterile materials did not agglutinate at all, it seemed that this agglutination phenomenon might be the result of infection with influenza virus in the chick: such in fact proved to be the case. It is quite an easy thing to demonstrate the agglutination phenomenon in the infected chick embryo. The egg shell is opened over the air sac, the outer chorio-allantoic membrane is torn away, and several large blood vessels are purposely ruptured. Fifteen to thirty seconds are allowed for the embryo to bleed into the allantoic fluid before the contents of the allantoic sac are emptied into a Petri dish. If the embryo has been infected with the influenza virus macroscopic agglutination of the red cells occurs within fifteen to thirty seconds in the Petri dish. If agglutination does not appear promptly it usually does not occur at all, and the differentiation between positive and negative eggs is thus rendered easy.

By using this agglutination phenomenon as an index of infection it was found possible to carry out virus titrations and serum neutralization tests. One-tenth c.cm. of the material is inoculated into the allantoic sac of 11-day-old embryos, which are allowed to incubate for two days; the eggs are then opened and positive and negative reactions are recorded. The end-points in serum and virus titrations are as sharp as those obtained in the mouse-protection test; agglutination tests work equally well with strains of influenza A and B virus and swine influenza virus, the specificity of each strain being easily demonstrated. A neutralization test with acute and convalescent serum from a case of influenza A demonstrated a rise in antibody titre in the convalescent serum which was consistent with the rise obtained in similar tests in mice. A test-tube agglutination reaction has also been elaborated. When infected allantoic fluid, either fresh or stored at −72° C., from which the red cells have been removed by low-speed centrifugation, is mixed with washed red cells from the normal developed chick agglutination occurs. The *in vitro* agglutination phenomenon is somewhat slower than that carried out in the egg, as it takes from five to twenty minutes to get a reading. The red cells sediment rapidly and form a characteristic ragged granular pattern on the bottom of the tube. When an influenza antiserum is added, in dilutions as high as 1 in 1,024, to the allantoic fluid infected with the homologous virus, the agglutination phenomenon is inhibited. The agglutination-inhibiting substance in human sera parallels the neutralizing antibody titre more closely than the complement-fixing titre. At present neither the mechanism of the agglutination phenomenon nor its specificity for influenza virus infections is well understood, but it seems that this test may well replace the mouse-protection test for determining serum neutralizing antibodies.

[1] *Science*, 1941, **94**, 22.

Dame Edith Mary Brown, M.D., Principal of the Women's Christian Medical College, Ludhiana, Punjab, has now completed fifty years of devoted work in alleviating the physical sufferings of Indian women by the provision of qualified Indian women doctors, nurses, and midwives. She first landed in Bombay on November 9, 1891, and with a gift of £50 from a Bristol lady she rented an old school house at Ludhiana, using a little hospital near by for the clinical teaching of her early students. From this small beginning the first medical school for women in India has developed into an institution where for years past there has been an average of 300 Indian women students in the medical, nursing, pharmacy, and maternity schools, with classrooms, laboratories, and a hospital of 260 beds. A tribute to Dame Edith Brown's pioneer work in the Punjab appeared in the *Times Educational Supplement* of November 15. A jubilee thanksgiving fund has been opened at the London office of the College, 39, Victoria Street, S.W.1.

Prof. F. C. Bartlett, F.R.S., who holds the Chair of Experimental Psychology in the University of Cambridge, has been appointed a member of the Medical Research Council in the vacancy caused by the death last July of Prof. A. J. Clark, F.R.S.

CLINICAL TEACHING

BY

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(From the Tennent Institute of Ophthalmology, University of Glasgow)

Generally speaking, one assumes that scientific knowledge is handed down by means of the written word. Advances are communicated to the journals, from these into books, and to students in the form of textbooks. This is certainly so in the exact natural sciences—physics, chemistry, botany, and the others; but there are limitations to this process. In individual schools attention is devoted to certain specialties; views are taught which differ from the opinions in other institutes, and special techniques are cultivated. Many such schools, like those of Karrer, Euler (vitamin chemistry), Einstein (theoretical physics), Mme Curie, Ramsay, and Rutherford (radiant energy), remain unique; but these are exceptional. In the main there is a *continuity* of teaching, and a new teacher can, without difficulty, proceed from the point arrived at by his predecessor.

It is quite otherwise in *clinical* instruction—not so pronounced with undergraduate as with postgraduate teaching. Personal methods, often unpublished, occupy an important position and have to be passed on to the pupil in connexion with appropriate cases. This applies to the choice of method in investigation and treatment, and to the determination of indications for certain operative procedures, and, last but not least, to operative technique.

Individuality of the Teacher

The choice of particular specialties within a specialty is very characteristic. In this matter the individuality of the teacher plays its part. The wide knowledge of the master, which even the most careful study of the literature cannot replace, saves the student from many handicaps which otherwise would be unavoidable. The daily instruction based on the clinical cases gives the junior a stimulus to pursue new investigations with results which are a source of pride to the master as great as if the work were his own. It was in this way that the large clinical schools came into being, such as the surgical clinic of Billroth in Vienna and of Czerny in Heidelberg, the ophthalmological school of Fuchs in Vienna and of Axenfeld in Freiburg, Cushing's neurosurgical clinic in Boston, the neurological and psychiatrical schools of Paris and Rome, and others. The unique character of the clinical work, of the teaching, of operative technique, and of investigation is absorbed almost unconsciously by the student. He receives the stamp of the school, and is initiated into many unpublished details through verbal tradition. Although each member of the school is concerned with his own line of investigation, all work together towards a common end.

It is obvious that this system has its drawbacks. A chief who has a strong individuality may tend to overpower his juniors; independent pupils often become antagonistic to their teacher, while the less independent lose the rest of their individuality; but there is no doubt the positive side of this kind of teaching prevails.

In this country what impresses a clinical teacher from Central Europe is this cult of individuality, and, as a corollary, the absence of "schools" in the explained sense of the word. All the prominent clinical scientists here are individual workers, not standing on the shoulders of predecessors and carrying forward their work. They are like mountains rising out of the plain without foot-hills! It is difficult to understand how these prominent personalities could perform their great work alone, without any help.

No doubt this has its advantages; for the need to overcome obstacles is a valuable discipline, and it ensures that only those really capable reach their goal and that all competitors are eliminated. On the other hand, the system involves a certain dissipation of energy, since each investigator has to make a fresh beginning, lacking the support of his teacher's experience; no one removes the stones from his path. The logical result is that the "middle class" of science, who form the backbone of scientific investigation everywhere throughout the world, are eliminated.

It seems to me unfortunate that the great mass of first-class ability which I have met with in this country is thus deprived of the opportunity for the easy training in clinical science of which it is capable. The large numbers of talented, interested, and enthusiastic young men whom I have met here present a guarantee of capacity for first-rate achievement. Their independence of thought and interest in new ideas would be the joy of any academic teacher. It seems to me that in this we may see an important principle of the British educational system, which aims rather at the development of individual character than at the accumulation of knowledge.

I have found the same characteristics in the undergraduates, whose powers of judgment and understanding are well above the average of those of Central Europe. The questions they ask in the course of their instruction show a gratifyingly acute grasp of essentials. But in this country medical education is placed far more in the hands of the young men *unaided* and unencouraged. They must take the trouble themselves to get up the necessary information. There is no doubt that they have a much harder time than their Continental comrades. As the number of paid assistants here is very few, most of the young men willing to learn more have to strive for their own living. Usually they serve their time as general practitioners. They gain their education in the chosen specialized subject by great sacrifice, by means of serving in their free hours as voluntary assistants in a clinic. They often arrive tired and worried, as they have only a short time at their disposal. The senior surgeon is so busy running his big clinic that he has very little opportunity for discussion and teaching, even with the best will to do so. I have often admired the idealism of these young people to be able thus to qualify themselves in spite of unfavourable conditions.

Choice of Clinical Teachers

For those of us who have been teachers in the universities of Central Europe it is particularly difficult to understand that the medical faculty of the university has hardly any control, for instance, in the choice of the majority of clinical teachers, except in the case of professors, and that the office of lecturer is often attached to that of physician and surgeon in a hospital in whose appointments the university has little influence. On further reflection, this also is seen to have a certain advantage, for the head of a clinic can easily become an absolute dictator when all the appointments to his special department are entrusted to him. At the same time it is risky to hand over the duty of instruction to any practitioner, however experienced, without regard to his capacity as a teacher.

If it is difficult to find a clinical teacher who possesses didactic, clinical, operative, and scientific ability in equal degrees, still more is it unfair to expect all this of a very busy practitioner, even though he lose no income. The practitioner who has to move from one job to another cannot have time for the necessary careful preparation of lectures even if he were well supplied with teaching material, which is not easily available. It will be especially unsatisfactory in the case of postgraduate instruction, where the effect of growing competition is great.

Clinical teaching as a whole-time job as we see it in many parts of the U.S.A., and also as adopted voluntarily by some outstanding individual and idealistic teachers in this country, is the only solution of the difficulty. Only by an adequate salary and pension provision can the whole-time teacher be freed from the burden of private practice with its competition, to find time for his teaching and for scientific work without care and without anxiety for the future.

The choice of full-time teachers must be very carefully made, and "inbreeding" must be avoided. Experience shows that the appointment of those educated and qualified in the same district does not bring the necessary fresh blood. I would strongly support the plan whereby clinical university chairs should not be restricted to citizens of these islands. Young American teachers, for instance, could bring new ideas and fresh opinions which would be welcomed here.

Chairs for Special Subjects

Only on historical grounds can we understand how it comes about that diseases of the skin, eye, nose, and ear, and the diseases of children are taught often in second-rate clinics with very limited teaching periods and no control by examination. These specialties have assumed their present significance only within the last few decades; their social importance has enormously increased, and the methods involved in their investigation and treatment have become too complicated to be taught, even sufficiently for the general practitioner, in the short time here allotted to them—namely, one term of ten weeks, three hours a week—while 300 hours of ophthalmology are compulsory at most of the Continental universities. The fact that there is only one professor of ophthalmology in the British Empire is scarcely credible.

But the authority of this professor is no greater than that of a lecturer. The foundation of similar chairs for such special subjects as diseases of the eye, nose and ear, children, skin, and neurology, with endowed clinics and with the power of examination, is a necessity for all universities. Whether private charity can achieve such great expenditure I naturally cannot say, but teaching and the care of the sick should not need to depend on whether a rich man will leave the necessary money in his will.

Independence of the Universities

The absolute independence of the universities in all directions from Government and politics is one of the greatest stimuli. We have learnt with astonishment to what straits freedom of teaching and learning can be brought by the uncontrolled dominance of absolutist States. That is the basic idea which has led to the independence of the universities in this country. A glance at conditions in Europe shows us clearly enough that domination of the universities by the State is not an ideal for which to strive.

But in a democratic State it is easy to have security of the universities from excessive Government control, as we see in the exemplary constitution which the universities of my country, Czechoslovakia, owe to Masaryk, the first President of the republic. Even the high schools are national, but the Government had merely the power to confirm appointments, and every other form of interference is rendered impossible by law. Thus the remarkable condition arose that the *German* University of Prague, the high school of a minority, was the last *free* and independent German university at a time when all others except those of Switzerland were under dictatorial control.

In Great Britain, this democratic country of individualities, there would be little danger to freedom in teaching and learning, even under financial dependence on the State.

An Urgent Aim

The future of the nation lies with the youth. That which life has taught us, our knowledge, is a *loan* only, and we have to pass it on to the next generation after it has been increased by the result of our research work. All depends on the education of the young medical men, to whom will be entrusted the health of the nation. To educate these promising young men in the most skilful and efficacious manner and to remove the whole affair from the atmosphere of financial anxiety is the most urgent aim of the medical schools, universities, and Government.

The first thing to have in view is the instruction of the coming academic teachers responsible for the education of the future generation of physicians. It is more than careless to leave the election of these to chance, as happens everywhere (I am not informed how it is done in Soviet Russia), instead of seeking the most suitable. The best of all the medical pupils must be chosen according to their creative gifts, to their knowledge and enthusiasm, and they should get scholarships and paid assistantships to provide their livelihood, just as lectureships are available in physics, chemistry, etc. The young clinician has to dedicate himself to full-time learning, research, and teaching. During this time of apprenticeship at the clinic the young scientist requires study-leave to take up special methods in other clinics. This study-leave is one of the most important factors for the furtherance of development. This is usually very difficult to arrange later on, owing to the calls of private practice and family life. The best time for such a study-leave is towards the end of the assistantship, when four to five years of careful learning have made the young man into a well-informed clinician who has probably by this time published some results of his research work. It is a disadvantage that the teachers and specialists in this country often receive all their education and pursue their calling *in one centre*. The danger of "inbreeding" can be avoided only by the interchange of clinicians and teachers between the different schools and universities of this country and abroad.

The Specialist

At least three to four years' intensive full-time training should be required before a medical man is granted the title of specialist. I doubt if an examination limited to one or two days is enough to convince the examining board that the life and health of thousands can be entrusted to the candidate.

The specialist must progress with his profession: he learns the developments in his science by reading the medical journals, but personal contact with modern clinics is necessary. The best results have been obtained in the so-called "postgraduate courses" for specialists. One well-known clinician is deputed to prepare such a course, and he enlists the co-operation of other colleagues—specialists in related subjects. All advances in this specialty—in diagnosis, histology, chemistry, pathology, optics, in operations and treatment—are carefully gathered and concentrated into a week's teaching. Very often quite old senior surgeons sit enthusiastically at the feet of young teachers. The debates after the meetings are really delightful and are highly appreciated. These postgraduate courses in Continental schools, as well as in the U.S.A., where they have been highly developed during the last few years, are so greatly valued that usually not more than one-quarter of the applicants can be accommodated.

Excellent postgraduate teachers could be found in this country very easily. The specialists of the British Empire and of America would be the enthusiastic audience. There could easily be created medical centres greater than all previous ones. It is only a question of *organization*.

The education of the medical man is a matter concerning the whole nation as a unit, as well as concerning individuals. The national prosperity very often depends on it. The labour expended on this task is a fruitful one. It must follow the development of science closely, without regard to historical constraint.

Conclusion

I have attempted here to explain why Great Britain does not enjoy the world-wide importance in medical science which she should have in view of the great intelligence of her people. This is, in the first place, due to the lack of financial security for teachers which compels many able and outstanding men to waste their energy in private practice, and to the insufficient opportunities of specialist training, for young and promising medical men, who find themselves forced to concentrate their energies on earning a livelihood instead of devoting themselves to study, investigation, and research. I have repeatedly had occasion to learn that to follow the second of these courses is their real desire.

From all sides I hear of the longing for reforms, which are certainly on the way. The sooner they come the sooner will this country, so rich in creative talent, take the place in clinical medicine which the ability of its people entitles it to claim.

For perhaps the first time in German hospitals an attempt has been made in a reserve hospital to utilize sick and wounded soldiers for silkworm culture. The arrangements which had already been made in a military tuberculosis hospital served as a basis. The soldiers were set to work on the cultivation of mulberry trees, and followed on with the breeding of silkworms. The care of silkworms, which is easily learnt, was carried out under the instruction of experienced doctors and nurses. It is necessary, as in the case of all occupational therapy, that the doctor himself should take part in the work.

THE GEOGRAPHICAL DISTRIBUTION OF GASTRIC AND DUODENAL ULCERS IN THE BRITISH ISLES

WITH NOTES ON THE AETIOLOGY OF PEPTIC ULCER

BY

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At a meeting of the Section of Medicine of the Royal Society of Medicine Sir Arthur Hurst (1941) mentioned some remarkable differences between the incidence of peptic ulcer in soldiers and in civilians. In private practice duodenal ulcer was about four times as frequent as gastric ulcer, though in hospital practice this did not obtain (in three of the large London hospitals the statistics, both clinical and post mortem, over a good many years showed an equal incidence of gastric and duodenal cases). In the Army, apparently, duodenal ulcers were in the large majority.

In view of the increasing importance of peptic ulceration in both the Forces and the civilian population, the following investigation carried out in Aberdeen in 1938 and 1939 may be of interest.

Relative Incidence of Duodenal and Gastric Ulcer in the British Isles

During a "follow-up" investigation of 435 patients admitted to Aberdeen Royal Infirmary suffering from proved peptic ulceration the relative incidence of duodenal to gastric ulcers was found to be 6.8 to 1. When these figures were compared with others previously published it was found that the relative incidence of duodenal and gastric ulcer apparently varied slightly throughout the world, but very remarkably in the British Isles. The collected figures are shown in Table I. Although the series are not strictly comparable, some being from medical, others from surgical, wards, the findings in the different districts are constant enough to be considered significant. Two interesting facts have been noted: (*a*) the apparently high incidence of gastric ulcer in the hospital patients in London; and (*b*) the very constant sex incidence of peptic ulcer throughout the world, whatever the relative incidence of duodenal and gastric ulcers in a given area.

(*a*) The relative incidence of duodenal and gastric ulcers in hospital patients varies considerably between London and the Provinces. The ratio of duodenal to gastric ulcers (male and female) in London is 1 to 1, in Leeds 2.8 to 1, and in Scotland from 6.8 to 8 to 1. Luff (1929), reporting the collective investigation from the whole of England, found the ratio to be 1.8 to 1, intermediate between the London and Leeds figures. Table IA shows that the incidence of duodenal and gastric ulcers is very constant in private patients, both in America and in the British Isles, although the figures from America show a slightly lower ratio of duodenal ulceration to gastric ulceration. In Britain it appears that gastric ulcer is less common in the north than in the south, and, in particular, London seems to have a very high proportion of gastric ulcers (Table II).

TABLE II.—*Showing the High Proportion of Gastric Ulcer in London*

	Duodenal	Gastric
London	1,667	1,826
Leeds	927	327
Scotland	1,050	154

For purposes of comparison with figures being collected from the Forces, the numbers of males in these areas are shown separately in Table III. The incidence of duodenal and gastric ulcers in different age groups is available only in the Aberdeen figures, where it was found that the ratio of duodenal to gastric ulcers between the ages of 18 and 40 years, forming the bulk of the mobilized Services to-day,

TABLE III.—*Incidence in Male Civilians*

	Duodenal	Gastric	Ratio
London	529	426	1·2 to 1
Leeds	433	98	4·4 to 1
Scotland	639	55	11·6 to 1
Aberdeen (18–40 years)	255	28	9·1 to 1

TABLE I.—*Relative Incidence of Duodenal and Gastric Ulcers (Hospital Cases)*

Author	Duodenal			Gastric			Multiple	All Ulcers		All Ulcers				All Ulcers		District
	Males	Females	Total	Males	Females	Total	Male & Female	D %	G %	Male		Female		Male %	Fem. %	
										D %	G %	D %	G %			
Burger and Hartfall (1934)	—	—	774	—	—	888	—	49	51	—	—	—	—	—	—	London
Souttar (1927)	529	86	615	462	198	660	—	49	51	52	48	30	70	78	22	,,
Walton (1927)	—	—	278	—	—	278	—	50	50	—	—	—	—	—	—	,,
	—	—	—	—	—	—	—	—	—	—	—	—	—	77	23	,,
Flint (1927)	—	—	411	—	—	148	—	73	27	—	—	—	—	—	—	Leeds
Moynihan (1920)	433	83	516	98	81	179	23	74	26	82	18	51	49	76	24	,,
Luff (1929)	832	163	995	356	182	538	—	65	35	70	30	47	53	78	22	All England
Wilkie (1927)	234	76	310	22	30	52	51	86	14	92	8	72	28	71	29	Edinburgh
Young (1927)	112	16	128	10	8	18	—	87	13	92	8	67	33	81	19	Glasgow
	—	—	244	—	—	30	—	89	11	—	—	—	—	—	—	,,
Nicol (1939)*	293	75	368	23	31	54	13	85	15	93	7	71	29	75	25	Aberdeen
Hinton (1931)	—	—	270	—	—	34	6	88	12	—	—	—	—	—	—	New York
Emery and Monroe (1935)	—	—	1,167	—	—	215	53	84	16	—	—	—	—	85	15	Boston
Allen (1937)	—	—	1,002	—	—	434	—	70	30	—	—	—	—	—	—	,,
Moutier (1932)	—	—	495	—	—	133	—	79	21	—	—	—	—	—	—	Paris
Chang and Chang (1937)	173	52	225	84	26	110	20	67	33	67	33	67	33	77	23	Peking

TABLE IA.—*Relative Incidence of Duodenal and Gastric Ulcers (Private Cases)*

Author	Duodenal			Gastric			Multiple	All Ulcers		All Ulcers				All Ulcers		District
	Males	Females	Total	Males	Females	Total	Male & Female	D %	G %	Male		Female		Male %	Fem. %	
										D%	G%	D%	G%			
Barford (1928)	—	—	130	—	—	30	4	81	19	—	—	—	—	—	—	England
Ryle (1932)	—	—	209	—	—	52	—	80	20	—	—	—	—	—	—	,,
Nicol (1939)*	149	39	188	20	21	41	—	82	18	—	—	—	—	74	26	Scotland
Eusterman and Balfour (1935)	551	150	701	223	50	273	—	72	28	71	29	75	25	79	21	America
White (1926)	—	—	152	—	—	54	—	74	26	—	—	—	—	—	—	,,

* Unpublished.

was 9.1 to 1. Payne and Newman (1940) found a ratio of 4.2 duodenal ulcers to 1 gastric ulcer among 227 proved cases from the Forces, and Graham and Kerr (1941) reported that the ratio of duodenal to gastric ulcers among 158 serving men was 5.9 to 1. The great excess of duodenal ulcer in the Forces compared with gastric ulcer is similar to that found all over the world, excluding London.

(*b*) The sex incidence of peptic ulceration in both private and hospital practice is remarkably constant throughout Britain and the world generally, affecting males three times as frequently as females. In districts where the incidence of duodenal ulcer is very much higher than gastric ulcer the predominance of males is not quite so great, owing to a relative increase in the number of females suffering from duodenal ulcer (Table IV). Table I shows that this sex

TABLE IV.—*Sex Incidence of Peptic Ulceration*

	Males	Females	Ratio
London	1,707	499	3·4 to 1
Leeds	531	164	3·2 to 1
All England	1,188	345	3·4 to 1
Scotland	694	236	2·9 to 1

incidence of about three males to one female is very constant throughout the world. Certain differences in the aetiology of duodenal ulcer and gastric ulcer have been observed, and are here reported, as they appear to have a bearing on the problems of the geographical distribution and sex incidence.

Differences in Aetiology of Duodenal and Gastric Ulcers

Age Incidence.—The age of onset of symptoms in the majority of cases of duodenal ulcer is between 20 and 30 years. In gastric ulcer the curve for the age of onset is spread uniformly throughout life between the third and sixth decades, the maximum incidence being distributed evenly, without the marked peak between 20 and 30 found for duodenal ulcer (see Chart).

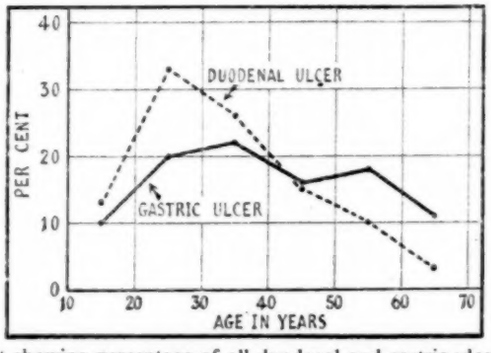

Chart showing percentage of all duodenal and gastric ulcers in 10-year groups. (Age at onset of symptoms.)

Family History.—In cases of duodenal ulcer a family history of peptic ulceration has been found more than twice as often as for gastric ulcer. In a control series of 300 cases of acute and chronic appendicitis a family history of peptic ulceration has been found with the same frequency as in the gastric ulcer patients of this series (Table V). The

TABLE V.—*Family History*

	Positive	Negative	% Pos.
Duodenal ulcer	76	292	21
Gastric ulcer	5	49	10
Appendicitis	29	271	10

larger number of positive family histories among the duodenal cases has been shown to be statistically significant.

Factors associated with the Onset of Relapse of Duodenal and Gastric Ulcers.—Davies and Wilson (1937) pointed out the very frequent occurrence of external events causing mental or psychological strain shortly before the onset of dyspepsia in peptic ulcer patients. They found that such events were present in 84% of their cases. Using their methods of investigation in 232 patients of this series (187 duodenal and 45 gastric ulcers) external events of a nature disturbing to the patient have been found on 160 occasions (Table VI). These events have been classified

TABLE VI.—*External Factors*

	Duodenal	Gastric	Total
Mental Strain :			
Worry—			
Family troubles	22	2	24
Finance	21	—	21
Employment	19	6	25
Mental overwork	14	2	16
Excessive mental drive (Culpin, 1935)	11	1	12
Total	87	11	98
Physical Strain :			
Dietetic errors	21	15	36
Unusual physical effort	10	2	12
Upper respiratory infection	—	2	2
Unexplained seasonal incidence	1	—	1
Excessive smoking	1	3	4
Miscellaneous	—	7	7
Total	33	29	62

under two headings, mental and physical. An external factor was thus found in 70% of patients, the strain being mainly mental or psycho-physiological in 43% and mainly physical in 27%. The factors most often associated with the onset or relapse of symptoms are worry and dietetic errors. There is a marked difference in the incidence of gastric and duodenal ulcers due to these two factors : mental strain is more commonly associated with the onset or relapse of duodenal ulcers ; physical factors, mainly acting through irritation of the gastric mucous membrane, are more frequently associated with the onset of gastric ulcers. Worry or overwork often leads to faulty dietetic habits, and many nervous or irritable patients blame dyspepsia as the cause of their irritability. Overlapping of mental and physical factors is bound to occur, but among the patients examined and classified in Table VI one predominant factor could always be found. The larger number of duodenal ulcer cases falling in the mental strain group is statistically significant.

Ulceration of both the stomach and the duodenum was found in 13 patients of the Aberdeen series (not included in Table VI). Among these patients only 2 had associated mental and physical strain factors, both of which could be classed as important ; in 5 the external factor was physical in type, in 2 mental, and in 4 no external factor of disturbing significance to the patient was discovered.

Discussion

In view of (1) the variation in relative incidence of duodenal ulcer and gastric ulcer in Britain and throughout the world, and (2) the differences noted in the aetiology of the two forms of ulcer, the following hypothesis is advanced.

Two different sets of factors are at work in the causation of peptic ulceration. These can be called " D " factors, leading to duodenal ulcer, and " G " factors, resulting in gastric ulcer. The " D " factors are usually inherited, but may be aggravated or even originated by mental stress and anxiety. They are active most frequently in the third decade of life, and appear to be psycho-physiological in character. The " G " factors, on the other hand, are not inherited, occur throughout life more or less uniformly from the second to the sixth decade, and lead to local

trauma of the gastric mucosa. The sum of the "D" and "G" factors causes peptic ulceration approximately three times as often in males as in females.

Without detailed knowledge of the environmental conditions and habits, both mental and dietetic, of the general population of this country, it is impossible to test this hypothesis satisfactorily, but arguments can be brought forward to support it.

It is probable that faulty habits of eating or occasional excesses, resulting in trauma to the gastric mucosa, occur throughout life and are not mainly concentrated in the third decade. Upper respiratory or other infections at a distance from the stomach but which may result in acute focal gastritis of a blood-borne type, and acute febrile illnesses, are also found throughout life. During the decade in which the majority of cases of duodenal ulcer start—i.e., 20 to 30—the individual is faced with the issues of success or failure in his or her profession, and has often assumed responsibilities which strain both his ability and his financial resources. Later, as security becomes more certain and responsibility is less of a strain upon the individual the incidence of duodenal ulcer falls.

If it be assumed that the "D" factors are chiefly psycho-physiological in character and the "G" factors act mainly by irritating the gastric mucous membrane locally, an explanation is supplied for the greater incidence of both types of ulcers in males. Worries of all sorts, errors of diet or excesses of eating and drinking, and irregularity in meal hours are all much more apt to occur in males than in females. The incidence of peptic ulcer, particularly of duodenal ulcer, has increased in females since the beginning of the century in common with the incidence of peptic ulcer as a whole (Wilkie, 1927), and this may be explained by the increased responsibilities assumed by and delegated to the female sex. The swing from a preponderance of gastric ulcers to a preponderance of duodenal ulcers that has occurred since the beginning of the twentieth century is due to (*a*) improved methods of diagnosis, (*b*) an increase of "D" factors (hurry, anxiety, competitive strain, etc.) which has occurred since the beginning of the present century, and (*c*) a reduction in "G" factors owing to an improvement in the nation's diet and a spread of knowledge regarding physiological methods of eating.

London is the only big city in the world in which an equal number of duodenal and gastric ulcer patients are treated in hospital. There are two possible explanations of the London figures: (1) that the population of London has dietetic habits that differ from those of the populations of other cities; or (2) that the percentage of patients in London suffering from duodenal ulcer who are treated as in-patients in hospital, and not as out-patients or as private patients in their homes by general practitioners, is less than in other cities all over the world.

Since the figures for the incidence of duodenal ulcers and gastric ulcers in London differ so materially from those available from other large cities all over the world, it is suggested that the second explanation given above is the correct one.

It is generally believed that peptic digestion of a devitalized area of gastric or duodenal mucous membrane is the ultimate factor in the production of peptic ulceration. The cause of this devitalization is not known for certain, and no doubt many factors play a part. Cushing (1932) and Necheles *et al.* (1938) have noted an association between nervous lesions or disturbances and peptic ulcer. In view of the above-noted aetiological importance of external factors, chiefly psycho-physiological disturbances ("D" factors), in the production of duodenal ulceration, and local trauma to the gastric mucous membrane ("G" factors) in gastric ulceration, it is suggested that the cause of the devitalization is mainly psycho-physiological in duodenal ulcers and traumatic in the case of gastric ulcers.

Summary and Conclusions

The relative incidence of duodenal and gastric ulcers in hospital patients varies throughout Britain from 1 to 1 in London to 8 to 1 in Scotland.

Evidence is brought forward to suggest that the figures for London do not give a correct picture of the relative incidence of duodenal ulceration and gastric ulceration in that city.

The sex incidence of peptic ulceration is remarkably constant throughout the world, being approximately 3 males to 1 female.

The incidence of peptic ulceration in the Forces is what would be expected from the civilian pre-war figures.

The aetiology of duodenal and gastric ulcers varies in age incidence, familial tendency, and precipitating cause of onset.

It is suggested that psycho-physiological factors play the most important part in the production of duodenal ulcers, and that local trauma to the gastric mucosa plays the biggest part in the production of gastric ulcers.

I wish to express my indebtedness to Prof. L. S. P. Davidson for much help and encouragement in the preparation of this paper.

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Detailed description and statistics have been omitted from the 1940 report of the work of the social service department, Samaritan Fund, of St. Thomas's Hospital. What speaks more eloquently is the description of the days after the first bombs had fallen on the hospital and surrounding district, an extract of which is given here to show how difficult and all the more necessary was the work of the Samaritan Fund during that time: "To Lambeth itself, the mere fact that the hospital during these dark days was continuing to treat patients had a steadying effect only realized in full by those who were working there day in and day out throughout the period. Everywhere the normal and the abnormal were in strange juxtaposition. . . . Suffering was widespread. Many of the patients from one hour to another were rendered homeless: in many cases everything they treasured was lost. More than ever was it necessary for the almoners to do everything in their power to lessen and relieve the suffering in every way possible. . . . Very often the needs were small, even trivial, yet the fact that they were met promptly and adequately had a significance to the patients greatly in excess of the specific service given, for it meant that with a world in flux they could still feel that the hospital regarded them as individual human beings whose sorrows and anxieties were of consequence, whose recovery to health was something worth struggling for."

MEDICAL SUPERVISION OF INDUSTRIAL WORKERS

REPORT OF B.M.A. SPECIAL COMMITTEE

An important contribution to the war and post-war industrial situation is made by the report, just published, of a Special Committee set up by the Council of the British Medical Association last year. The instruction to the committee was to make recommendations for the better co-ordination of industrial medical practice with the existing medical system, particularly with general practice and the public health and hospital services.

The personnel of the committee included eleven medical members; also a prominent Lancashire industrialist, a trade union leader, and the director of the Industrial Welfare Society. Observers attended from the Factory Department of the Ministry of Labour and from the Ministry of Supply. The committee confined its attention to the places of work covered by the Factory Acts; collieries were not included in its scope.

The report, presented by deputation to the Minister of Labour and National Service, outlines the place of medicine in industry and defines the duties of an industrial medical officer and the staffing of his department. The relations of the industrial with the outside medical services are mentioned, and there is a brief reference to rehabilitation, but the views of the Association on this last subject were fully set out in the report of the Committee on Fractures in 1935 and in the evidence submitted a year ago to the Royal Commission on Workmen's Compensation. Medical education for industry and industrial health research are the subject of some recommendations, and the final chapter is on the future of industrial medical practice. There are two appendices; one reproduces the ethical rules for the guidance of industrial medical officers in dealing with outside medical services, as approved by the Representative Body in 1937; and the other is a memorandum by the Association of Industrial Medical Officers on a syllabus for courses of instruction.

Place of Medicine in Industry

The starting-point taken by the committee is the view expressed by the Council of the B.M.A. that on both humanitarian and economic grounds the time is ripe for an extension of industrial medical service, and that more emphasis should be laid on the preventive aspects of industrial medicine, that there should be closer association between the medical profession and industry, and that the part played by industrial factors in the causation of disease should be more fully appreciated by both medical practitioners and employers.

Industry loses through the ill-health of workers 31½ million weeks' work in a year, and while it is not suggested that conditions in industry are the primary source of this loss, the environmental conditions during the working day must account for a large share. The loss resulting from accidents is estimated in terms of money at over 30 million pounds a year. Accidents do, of course, occur to the healthiest employee, but much of the time which might be lost as a result of them is saved if there are adequate arrangements for medical supervision. One firm reports complete disappearance of its special hazard—lead poisoning—as a result of medical care. In contrast with the average loss through illness of 10 days a year for men and 12½ for women (the figures are pre-war), firms employing from 700 to 6,000 workers have reduced this sickness absence, as a result of rendering medical service available, to from 3.75 to 5.25 days for men and from 4.5 to 7.9 days for women.

Medical supervision is not merely nursing, welfare, first aid, and accident prevention, or even the retention of a local practitioner on call in emergency. It implies continuous supervision of the health of the individual worker in his industrial environment, the prevention so far as possible of physical and mental illness, a service for the initial treatment of injury, and efficient medical liaison between the factory and external medical services.

This does not necessarily mean an elaborate medical organization, beyond the capacity of small firms. Indeed, it is in the small firms that the future development of industrial medical practice must be expected, for they represent in total the larger proportion of the industrial population. More than half the number of factories in this country are small ones, employing fewer than 250 people.

Duties of an Industrial Medical Officer

A medical practitioner accepting a post in industry, whether part- or whole-time, must have some knowledge of industrial organization and factory methods, and must make himself familiar with the processes in his own factory. His duties can be set down under the following heads:

1. Medical supervision of employees during working hours.
2. Supervision of general working conditions.
3. Organization and supervision of accident service, including rehabilitation.
4. Study of specific occupational hazards and preventive measures for their control.
5. A.R.P. services.

Medical examination of new employees under 16 and of workers about to be employed in certain special processes is compulsory, but in the committee's opinion medical examination of other new entrants would be valuable in making possible the proper placing of workers. Workers returning after prolonged sick absence should be seen by the industrial medical officer. Here the general practitioner's knowledge of the medical history of the individual and the home conditions should be of value.

It is considered that the industrial medical officer should devote some of his time to advising individual workers. He should also encourage the management to undertake health education. Careful records should be kept, consisting of (1) an ambulance room or casualty department book, (2) records (confidential) of medical examinations and individual case histories, and (3) statistical records of sickness absence.

As for accident service and rehabilitation, the medical officer must be responsible for securing that first-aid personnel are properly trained. Where there is a central casualty department he himself should train the staff, who would be responsible to him alone. Unfortunately the country does not as yet possess a comprehensive rehabilitation service, but the industrial medical officer will find that he can do a great deal to assist in the early return to suitable work of men who have been seriously injured. This again will call for close liaison with hospital officers and general practitioners.

Women in industry show a consistently higher sickness-absence rate than men, and this is not wholly explained by gynaecological conditions. A good deal of it must be attributed to the physical fatigue and consequent lowered resistance caused by the effort of running the home in addition to the work at the factory. The supervision of the health of the woman worker requires much assistance from trained welfare staff, but the industrial medical officer also has an important part to play. The employment of women during the later stages of pregnancy and the post-natal period will depend upon the circumstances of the woman and her work. Withdrawal from employment four weeks before confinement is usually sufficient, but in many cases it will be desirable for her to remain away from work for more than four weeks afterwards.

The practitioner entering industry should know something of toxicology and industrial hygiene. If he enters an industry to which a special hazard is attached this will have his attention. Inspection or medical examination of workers employed on dangerous processes will be carried out at frequent intervals. The medical officer will be in close contact with technicians, scientists, managers, and welfare supervisors, and much of the success of his efforts will depend upon his ability to work harmoniously with them, as well as to establish good relations with local general practitioners, hospital staffs, and public health

and Government officials. In the treatment of an individual patient there should be a continuous interchange of information between the various practitioners interested in the case.

Medical Officer's Appointment and Remuneration

The medical practitioner appointed to an industrial post should have wide sympathies and interests, good experience in general practice, some special knowledge of the treatment of injuries, an interest in occupational hazards, and an acquaintance with social conditions prevailing in industrial communities. He will be directly responsible for all health services in the factory to the managing director, but he should be given the greatest possible freedom in carrying out his duties. A large factory or factory with special hazards will find a whole-time appointment the most efficient and economical. Small firms may find it sufficient to appoint a part-time officer to attend at agreed intervals and on emergency. A number of such firms might combine in appointing a whole-time officer whose services would be apportioned among them.

For a medical officer in charge of medical work in a factory the minimum starting salary should be £800 a year; for an assistant medical officer, £600-£650. Payment in part-time appointments should be at a sessional fee of 1½ guineas for a session of not more than two hours, or payment may be by annual salary based on sessional rates. The scale just given relates to wartime conditions only. A whole-time officer should be given opportunities for postgraduate work and for clinical experience, possibly by acting as clinical assistant at the local hospital.

The direct appointment of the medical officer by the employer, who often has not the knowledge correctly to assess medical qualifications and suitability, is not altogether satisfactory unless he is suitably advised, and the committee suggests a central advisory body external to the factory, perhaps under the aegis of a Government Department, to guide employers in making a suitable choice. A successful precedent is quoted from Eire, where there is a Public Health Commission which receives all applications for public health appointments and submits its choice to the local authorities concerned. It is considered advantageous if the medical officer is enabled to transfer from one post to another without losing seniority; thus he would gather experience in different kinds and sizes of factories, much as a public health medical officer obtains experience in different types of local government appointments.

On the subject of nursing staff, it is considered that a fully trained State-registered nurse should be appointed in factories with over 500 employees in which whole-time supervision of the ambulance room is required; but there is also a place, especially in smaller factories, for the assistant nurse and the whole-time ambulance man.

Relations with Outside Medical Services

Only such treatment as is necessary during working hours should be undertaken at the factory, except in the case of certain industrial diseases which the industrial medical officer is specially qualified to treat. Any further treatment should be undertaken by the patient's own doctor or by the hospital to which he is referred. Factory patients presenting themselves to a general practitioner fall into three main categories:

1. Patients suffering from minor injuries, who can be treated entirely by the practitioner or referred to a hospital, and patients suffering from major injuries who are already under hospital treatment and attend for certification only.

2. Patients suffering from specific industrial diseases who for the most part are already under specialist hospital treatment, and are also seen for certification only.

3. Patients with common illnesses in the origin or development of which the conditions at the place of work may have played a part.

The problem is to increase the efficiency of the service which the patient's own doctor can give in the prevention and treatment of illness and accident arising from, or aggravated by, industrial environment. To this end much more emphasis needs to be placed in medical education on the relation of industry to health and disease. The committee makes the suggestion that to the usual three histories noted in case-taking—namely, "past," "family," and "present conditions"—a fourth, "industrial," should be added. Another way of helping to solve the problem is again by interchange of information, the patient's doctor being kept informed of the progress of the illness which is being treated at the hospital or rehabilitation centre.

The need for a good working relationship between the general practitioner and the industrial medical officer is repeatedly stressed in the report. Such contact as at present exists is far too limited. It is suggested that the Divisions of the Association should consider what steps can be taken in their respective areas to promote means whereby the general practitioner can be brought into closer contact with the management of factories or with their medical officers. Visits of the medical profession to factories might be arranged.

> "The object should be to arrange for the general practitioner facilities for making himself acquainted with the work of his patients or of any one patient so that this knowledge may help him to decide how far a patient's health is affected by his work and to advise and prescribe accordingly. On the other side, the industrial medical officer, where there is one, and the management of the factory would have the advantage of knowing the views of the patient's own doctor and of co-operating with him to the benefit of the patient and of the factory work. It is emphasized that the committee in making this suggestion has no desire to interfere with the Factory Medical Inspectorate or with the arrangements made by the management within the factory. Its only aim is to free the general practitioner from his present handicap of having to treat the patient without a full knowledge of the latter's working life and environment. Much help could be rendered by the employer if, when a practitioner feels that he needs for the efficient treatment of a particular patient some knowledge of the patient's working conditions, facilities could be given him to obtain that knowledge."

Hospitals, again, should make early notification to the doctor of a patient admitted directly for major injury, and the hospital staff should collaborate with the industrial medical officer and keep him informed of the patient's progress. The establishment of the Birmingham Accident Hospital and Rehabilitation Centre (the old Queen's) is mentioned. Any extension of hospital facilities for treatment of industrial accidents is to be welcomed, although the development of such special hospitals must be slow until there is a more adequate supply of (it is the committee's word, not ours) "traumatologists."

Medical Education and Research for Industry

Industrial medical practice is a comparatively new field, and the medical curriculum at present does not accurately equip the student with the knowledge that is necessary to treat industrial illness and injury and to recognize those factors in ordinary illness which are due to the industrial environment. The committee is of opinion that more university posts relating to industrial medical practice should be created. In each of the main clinical subjects of the curriculum the student's attention should be drawn to the industrial aspect, and he should be taught to understand the effects of occupation on health. The student who subsequently becomes a general practitioner in an industrial area will then possess a groundwork on which to base the treatment of his factory patients.

Postgraduate instruction for such general practitioners might well take the form of the organization of short courses, especially at the week-end, also addresses on industrial medical subjects at scientific meetings of the Divisions, more articles on industrial medical practice in the medical journals, and the organization of collective research by general practitioners on the relation of industry and disease.

As for research, at present no organization in this country equipped with the necessary staff and finance is available to conduct industrial medical research with skill and efficiency, meaning by "research" the study by trained medical men, with technical assistants and equipment, of the health of workers in relation to their employment. The Industrial Health Research Board is not able to spend money without the consent of the Medical Research Council [of which it is in effect a department], and, moreover, during the war, when a great

extension of its work might have been expected, its secretary is required to devote part of his time to acting as Chief Medical Officer to the Ministry of Supply. To the Factory Medical Inspectorate, even if they make use for research purposes of the material acquired in the course of their duties, research is only incidental to their main work. Some medical departments of individual firms do research work, but on the whole such research is sporadic and uncoordinated.

Scheme for Scientific Inquiry

The committee recommends that machinery, preferably on a national scale, should be devised to place industrial health research on an adequate and efficient basis. A partial scheme might immediately be set up to cover certain important industries, such as munitions, mining, and shipbuilding, or certain highly industrialized parts of the country, such as Birmingham, Manchester, or Glasgow. The work of the staff of these national or regional organizations would be: (1) to undertake research into industrial problems affecting health; (2) to collect and analyse sickness records; (3) to test in practice the theories formulated from such analysis; (4 to disseminate the knowledge wherever it can be applied of any definitely established fact that bears upon the health of the workers. The organizations should be set up in close association with existing universities. The staff should comprise both medical practitioners trained in research methods and technical assistants. Minimum equipment should include beds in a hospital, pathological and chemical laboratories, animal houses, and a library.

The keeping of records of all sickness absence should be compulsory, for such records must be the basis of industrial health research. "The type of information that might be made available is already provided with regard to occupational mortality in the Registrar-General's Decennial Supplements, where a mass of facts indicates work that might be done before the worker appears on the records because he is dead." Metal-grinders, for example, show a significant excess of deaths from certain causes; textile workers from certain others. As illustrations of the value of records, the observation of Alfred Greenwood in 1891 of the relation between cataract and glass-bottle finishing, gathered from a study of the superannuation lists of the Yorkshire United Trade Protection Society, and the discovery by S. R. Wilson in 1906 of mule-spinners' cancer from the records of the Manchester Royal Infirmary, are mentioned. A number of wide-scale problems, such as nutrition, fatigue, hygiene, and the prevention of respiratory disease, call for vigorous scientific investigations if the ill effects of wartime privations are to be avoided.

Future of Industrial Medical Practice

The report of the committee, which opened with a slight historical review, mentioning the first example recorded of a factory medical service (in Scotland almost exactly one hundred years ago), closes with a chapter discussing the possibilities of future development. In a well-planned health service the health problems of the industrial worker should receive more recognition than is at present given to them. Under existing conditions this service is more or less detached from the other medical services, due mainly to unplanned development. There is also a cleavage of responsibility in the matter of environmental health services. Outside the factory the public health authority controls, through its medical officer of health, water supplies, sewage systems, provision for infectious diseases, housing, and sale of food, but inside the factory very little control over hygiene is exercised in the name of medicine. Certain matters are controlled by the medical officer of health, many more by the Factory Inspection Department of the Ministry of Labour, but only a small proportion of factory inspectors—one for every half-million workers—are medical practitioners.

It will be necessary to decide whether there should be a single industrial medical service for the whole country, with a uniform method of appointment and remuneration, whether such service should be administered under the existing medical system directly under a Government Department or as a local authority function, or, if it is to form part of a State Medical Service, how it should be administered both centrally and locally. Whatever the ultimate form of the service, the committee, for a reason already touched upon in this summary, recommends that there should be a uniform and generally acceptable procedure for the appointment of industrial medical officers. A single advisory body or an appointing body external to the factory should guide employers in the making of good appointments in a way acceptable to employers, workers, and medical practitioners alike.

The committee absolves itself from making any recommendations on the question of a full State Medical Service, the retention of the present system in its general framework, or intermediate forms of service. The Medical Planning Commission is at work on these problems, and its investigations will include the future of industrial medical practice. Whatever the ultimate form may be, the committee emphasizes its view that adequate provision should be made for the efficient co-ordination of factory health services with all other branches of health service, the association of the family doctor with the factory life of his patients, improved training and regular postgraduate courses for industrial medical officers, and systematic medical research in industry.

The report is published as a "grey book" by the British Medical Association (price 6d.).

CHEMISTRY AND PHARMACY

ADDRESS BY DR. HAROLD KING

The Hanbury medal of the Pharmaceutical Society of Great Britain was presented on November 13 to Dr. HAROLD KING of the National Institute for Medical Research. The President of the Society (Mr. WALTER DEACON), in making the presentation, described Daniel Hanbury, who was made F.R.S. in 1867, as one of the greatest pharmacists of all time.

Dr. King then gave an address on the relations of chemistry and pharmacy. The two subjects, he said, had been interdependent throughout the ages. As experimental sciences they were only between one hundred and two hundred years old, but as arts they had been practised from time immemorial. Their workshop traditions had been handed down from prehistoric ages, and it was not until the middle of the eighteenth century that chemistry began to blossom out of pharmacy and became a separate science. In a brief sketch of the early history of pharmacy Dr. King mentioned that the Babylonians and Assyrians knew of 250 drugs of vegetable origin, many of which served as the basis of the Materia Medica of the Greek physician Dioscorides of the first century of the Christian era.

The isolation of alkaloids, in very many cases by pharmacists, was the first important pharmaceutical development of the nineteenth century. In the current *British Pharmacopoeia* and its Addenda there were included twenty-one pure alkaloidal substances and their salts, and, of these, sixteen were first isolated by pharmacists. This early work on alkaloids was a great contribution made by pharmacy to chemistry. All those familiar with the changes in succeeding editions of the *British Pharmacopoeia* in recent years must have been struck by the decrease in the number of plants and the great increase in synthetic drugs included in it. It was instructive to examine how some of these substances originated. Many of the chemical substances were known for years before their therapeutic action was suspected. A number of them were laboratory curiosities of the chemist. It was not until forty-six years after its discovery that aspirin was introduced into therapeutics. Sulphanilamide was first prepared in 1908 in a search for components of dyes, but not until 1935, arising out of the German work on red prontosil, were its therapeutic properties discovered. Carbon tetrachloride was first prepared in 1840, but not until 1921 was its action on the hookworm recognized. Chloral hydrate was discovered in 1832 by Liebig, but only in 1869 were its hypnotic properties unmasked.

Speaking of the active principles which have been isolated from plant or animal tissues, including the majority of the alkaloids, hormones, and vitamins, Dr. King said that in the isolation of these principles or quintessences was to be seen the materialization of the dreams of Paracelsus, the first great pharmaceutical chemist. Substances which had risen mainly

as a result of organized research, with the pharmaceutical chemist and the pharmacologist in co-operation, including hypnotics, analgesics, anaesthetics, antiseptics, had been discovered, many of them in Germany, either in the universities or institutes or in the laboratories of large pharmaceutical organizations; and here the interval between the preparation of the substance and the discovery of its therapeutic properties had been quite short. Long-term organized research in pursuit of new drugs was the duty of large commercial organizations and subsidized undertakings, while the *laisser-faire* method of research should be the preserve of the university worker. What was needed in this country was more of the organized research into the chemistry of synthetic drugs and more pharmacological examination of the products of the chemical laboratory.

Finally, Dr. King mentioned some work which he had carried out on the alkaloids of curare. He said that he had been able to examine a specimen of curare which was deposited with the Pharmaceutical Society a hundred years ago, and this had enabled him to prepare in a crystalline state the active principle of one of the arrow poisons used by the South American natives. He had also been able to examine eleven species of *Strychnos*, and of these five had a curare action.

Sir HENRY DALE, in a few remarks after the address, endorsed what the lecturer had said about the enormous wealth of subjects offered by pharmacy to the chemist and through the chemist to the pharmacologist; just as, on the other hand, physiology and pharmacology in their turn were beginning to offer subjects to the chemist and through the chemist to the pharmacist.

Reports of Societies

PLACENTAL INFARCTS

At the last meeting of the Section of Obstetrics of the Royal Academy of Medicine in Ireland, held in Dublin, with the President of the Academy (Mr. SETON PRINGLE) in the chair, Dr. N. FALKINER read his presidential address on the subject of placental infarcts.

Dr. Falkiner alluded to the customary teaching with regard to these lesions and to the fact that most teachers in obstetrics did not attach much significance to their association with the toxaemias of pregnancy. He next described the work that Young had published in 1914. The main points in this work were the accurate description of the red infarct and its association with eclampsia. Prof. Young had evolved an attractive hypothesis and had made a most valuable contribution which included many interesting and stimulating statements with regard to placental anatomy and physiology. Recently workers in America had revived the views put forward by Young. Among these were Bartholomew and his co-workers. Careful examination of placentas from all toxaemic cases had resulted in the recognition of certain types of placental infarct in association with different clinical manifestations. Among the conclusions reached by these workers were: (1) Placental infarcts of the more acute types were definitely associated with the toxaemias of pregnancy. (2) It was possible to predict the type of infarct to be found in the placenta from a knowledge of the history. (3) With the experience of examining placentas as "unknowns," it had been found possible to establish criteria for an exact classification of placental infarcts and their relation to toxaemia. With regard to the significance of hypocholesteraemia and hypothyroidism as predisposing to infarcts in the placenta, the opinions of both Young and Bartholomew coincided in that they believed that the acute placental infarct had an aetiological significance. They differed in their interpretation of the causal factors producing these lesions.

Dr. Falkiner showed sections from twenty cases of toxaemia of pregnancy and demonstrated the constant occurrence of acute infarcts in pre-eclampsia and eclampsia, and said that the older or more chronic infarcts were associated with nephritic toxaemias.

General Discussion

Dr. GIBBON FITZGIBBON said that he himself had made no investigations on this subject. He had found a few infarcts and had more or less discounted them as being causative elements in the toxaemias of pregnancy. Dr. BETHEL SOLOMONS said that the display of placentas that evening was extraordinarily interesting, but, alas! it shed little new light on the problem of the toxaemias. However, the work was valuable inasmuch as it might prove to be a link in the elucidation of the problem. It would be of great value if a series of placentas from normal cases were compared with a series of placentas from toxaemia cases. The relation of infarcts, and a good or bad decidual circulation, to toxaemias was still a puzzle. The general belief was that when infarcts were present with good decidual circulation the toxaemia was more severe.

The MASTER OF THE NATIONAL MATERNITY HOSPITAL referred to the very great delicacy of the vessels in the placenta, and said that the rate of growth of these vessels was enormous. When growth of this kind occurred something was bound to go wrong, and this would explain in some degree the development of infarcts. The most interesting question in his opinion was whether the toxaemia was due to the infarct or the infarct due to the toxaemia; he himself thought that the infarct was due to the toxaemia. Prof. A. H. DAVIDSON thought the chief question was, Did infarction come from the maternal circulation or from the foetal circulation? In his view it came from the latter.

Dr. R. M. CORBET had been greatly impressed with the researches of Bartholomew and his co-workers. While Dr. Falkiner did not suggest that these infarcts were aetiologically significant, Bartholomew was strongly of the opinion that they were the cause of the toxaemia. If this were so, it raised certain speculations. To have the foetal vessels primarily affected would postulate a hypercholesteraemia in the foetal circulation; also, the question might be raised why the foetus was not always affected to the same degree as the mother. Dr. Falkiner had suggested that, when the infarction was acute, the whole cotyledon was involved. If this were so, the toxins liberated might not be absorbed by that cotyledon, but would be carried upwards in the maternal blood stream to the subchorionic pool, where there was little or no absorption, and thence into the general circulation, where they might be taken up by the maternal tissues before the blood returned to the placenta, thus leaving the foetus unaffected.

Dr. J. S. QUIN said that Dr. Falkiner's paper must be looked upon as being only a very early progress report. He thought the question was, Were these lesions the cause or the effect of the toxaemia? Dr. W. R. F. COLLIS said that Dr. Falkiner's paper was especially interesting from the point of view of foetal death and immature birth, which was the largest cause of foetal mortality. His experience was that in every case in which there was toxaemia in the mother there was toxaemia in the baby as well. Wherever the toxin was it certainly got into the foetal circulation. What were the cause and the mechanism of the actual thrombosis? Was it foetal or maternal? Had any work been done on the blood coagulation of babies born of eclamptic mothers?

Dr. FALKINER, in reply to the discussion, said that this work was still going on. The decidua had not been examined in any case: it was a most difficult thing to examine the decidua in the placental circulation. There were reasons to back up the view that disturbance of the maternal circulation would cause infarction. The greater proportion of patients who developed sugar in the urine during pregnancy developed albuminuria.

The Medical Director of Hospitals in Germany has recently stated that the special conditions brought about by war, and particularly in the areas liable to air raids, have made it necessary to have much more frequent blood transfusions from man to man than used to be the case. In most cases blood transfusion is a life-saving measure for sick or wounded persons. As a result of an earlier appeal issued by the Party very many people have offered themselves as blood donors, but meanwhile the demand for blood donors has grown so large that more volunteers must be obtained.

Correspondence

Economy in Dressings

SIR,—Your leading article on the above subject (November 1, p. 619) is very opportune and draws attention to a matter of increasing importance at the present time.

It may be of interest to place on record that for the past seven years I have used perforated cellophane dressings in the case of all abdominal incisions in my department at the General Hospital, Birmingham, and am continuing the same at the Queen Elizabeth Hospital to-day. No gauze and no cotton-wool are used in "clean" cases. The cellophane adheres to the skin and is simply covered with a flannelette washable pad kept in place by tapes. For the first twenty-four hours a "many-tail" binder is also applied, mainly for the patient's comfort during the vomiting phase after anaesthesia.

Apart from economy in gauze and wool—both expensive items to-day—the nursing staff favour cellophane coverings to the wound because the method facilitates easy and rapid inspection of the area involved. The cellophane must be perforated before use to permit of evaporation from the skin.—I am, etc.,

Birmingham, Nov. 14. BECKWITH WHITEHOUSE.

Infantile Scurvy

SIR,—We read with great gratification the announcement in the *Times* of November 12 that it is the Government's intention to distribute free fruit juice and cod-liver oil compounds at welfare centres.

In a recent investigation of the number of cases of infantile scurvy coming to hospital and seen in various clinics about London, there appears to be a slight but definite rise. The cases seen at the Hospital for Sick Children, Great Ormond Street, were as follows:

Year	No. of Cases of Scurvy	No. of New Patients Treated
1938	3	31.057
1939	3	24.307
1940	2	10.109
1941 (to Oct. 4)	8	6.474

Although this is a very small number (1941), it will be seen that there are relatively more cases when one takes into consideration the total number of new patients seen in 1941 as compared with the total numbers seen in the three preceding years. This suggests that more care must be paid by the welfare officers and others in instructing mothers in the prevention of scurvy. It should be pointed out that orange or tomato juice, or blackcurrant puree, is quite necessary, and that cod- or halibut-liver oil or some of the malt preparations are no substitute. Not less than four teaspoons of fruit juice appears to be necessary for children of 6 months and older. Ascorbic acid, from 30 to 50 mg. daily, should be substituted where natural vitamin C is not available, but should not be given for preference. After the age of 18 months to 2 years there appears to be plenty of vitamin C in the diet to cover the infant's requirements.

A great responsibility rests on infant welfare centres where proprietary malt preparations are dispensed and recommended, some of which are not even claimed by the makers to contain the minimum amount of vitamins. We have seen acute rickets develop on such preparations. Cod- or halibut-liver oil should, of course, be given throughout the winter months.—We are, etc.,

DONALD PATERSON, M.D., F.R.C.P.
London, W.1, Nov. 14. W. GUY DAYNES, M.R.C.S., L.R.C.P.

Diagnosis of Helminth Cysts in the Brain

SIR,—Dr. L. J. Segal (November 15, p. 693) describes a case of suspected hydatid of the brain treated with sulphathiazole. The title of the paper describing this as "cysticercosis epilepsy" is surely misleading, for the author states quite definitely that "in view of these findings it was considered that the symptoms were due to the presence of a hydatid cyst of the brain."

But this diagnosis is apparently based solely on the discovery by *x* rays of a cyst about the size of a five-shilling piece in the left lung and "a suggestion of an infected left maxillary antrum." On the evidence available I think the diagnosis extremely doubtful. As the patient, while serving in the Navy in China, suffered from a "tropical disease," with loss of consciousness and with subsequent headaches and mental depression, I take advantage of Dr. Segal's request for comments to suggest that possibly this case is one of cerebral invasion with the eggs of *Schistosoma japonicum*, and that a microscopical examination of the faeces may even yet reveal their presence.—I am, etc.,

St. Albans, Herts, Nov. 17. R. T. LEIPER.

The Bombed Child and the Rorschach Test

SIR,—Dr. W. E. R. Mons (November 1, p. 625) suggests that the Rorschach test reveals the "bombed" child as a clinical entity, with special reference to K responses having a fire or explosive content given to the lower red in Card II. Since he adds that his findings must be regarded as tentative, pending records of a larger number of cases, it may be worth while, in corroboration, presenting the following small series, carried out with evacuee children in the County of Hunts, by kind permission of Dr. C. B. Moss-Blundell, county medical officer of health:

Age	Sex	Disorder	Response	Rorschach Determinant
		Bombed:		
15	F	Hysterical fainting	Flames	K
12	F	Delinquent, unstable	Flames	K
12	M	Facial tic, enuresis	Nil	—
11	F	Unstable personality	A ray	K
13	M	Compulsive pilfering	Sunset	K.C.
9	M	Enuresis, anxiety	Nil	—
12	M	Pilfering, aggressive	Horse's head	Ad
10	M	Pilfering, anxiety	Fire blaze	K
11	F	Anxiety state	The sun	K
8½	M	Facial tic, school failure	Guns going off	Km
		Unbombed:		
9	F	Psychopathic personality	Nil	—
10	M	Anxiety hysteria	Nil	—
10	M	Asthma, enuresis	Red fluid	Km.C.
10	M	Temper storms	Ink stain	C
12	M	Pre-psychotic, delinquent	Horse's head	Ad
9	M	Enuresis, anxiety	Church spire	Scene
12	M	Unstable personality	Animal	A
13	M	Anxiety	Bird's head	Ad
16	F	School failure	Part of butterfly	Ad

It will be seen that of these nineteen consecutive cases 70% of the bombed give fire or explosive K responses: the only K response in the unbombed group was given by a child who saw the results of severe bombing within two miles of his home, though his immediate neighbourhood did not suffer. As K is accepted by Rorschach authorities as a sign of disturbance in the deeper layers of the personality, these reactions seem significant, not necessarily of a "bomb-induced neurosis" (for some children in both groups showed symptoms of maladjustment before the war) but of serious endogenous anxiety aroused by traumatic experience.

There is another point of interest in this connexion. Klopfer describes the K response as indicative of mental "haziness or fog" created by anxiety; and also notes that such responses are often tinged with dysphoria. Such a condition would account for the commonly observed failure of bombed children to concentrate on school work, though they may struggle hard to do so.

As Dr. Mons points out, it would be unscientific to draw definite conclusions without examination of the whole Rorschach record in each instance and of a larger number of cases, but these preliminary results may perhaps serve to justify a fuller investigation into the effects of bombing upon children.—I am, etc.,

A. T. ALCOCK,
Huntingdon, Nov. 15. Child Guidance Officer, Hunts.

Increase of Tuberculosis

SIR,—Dr. A. L. Jacobs (November 15, p. 708) notices my short letter (November 1, p. 632) in a somewhat formidable reply. In this he misquotes me by attributing to me the statement that the increase of tuberculosis at present evident "is to be explained entirely" by the discharge of a number of sana-

torium and hospital patients at the outbreak of war. I spoke of "the unwitting power of spreading the infection to those about them" possessed by the tuberculous, and, referring to the numerous theories now current on the subject, asked: "Is it necessary to postulate anything else?" I did not say or imply that the increase was to be explained entirely by the numbers of infective cases then added to those normally outside the sanatoria.

I am unable to accept Dr. Jacobs's statement that my contention as to the danger of infection is "one of the minor aspects of the problem." On the contrary, I consider it the keystone to the whole incidence of tuberculosis infection and disease. I take it, Sir, that Dr. Jacobs will not deny that clinically evident tuberculosis is due, in the first place, to infection. There may be, and are, secondary causes: poverty, unemployment, defective nutrition, close contacts, bad housing, want of resistance, and the various environmental disabilities; but infection is the one factor that underlies them all.

There is a great deal of poverty at present no doubt, but is there more or less than before the war? Is unemployment greater now than in pre-war England? Is it so much less as to be almost insignificant? Is nutrition really so very defective? There is not much clear evidence for or against in the incidence of proved "deficiency diseases." Bad housing and accommodation in shelters may lead to the spread of tuberculosis by bringing about more intimate contact between the tuberculous and the healthy, and there may well be a loss of resistance under the stress of war conditions, but, if so, this can only be operative by lowering the level at which infection leads on to disease. The National Association for the Prevention of Tuberculosis says, in a recent pronouncement, that "(*a*) in unselected samples of the normal apparently healthy adolescent population the incidence of definite pulmonary tuberculosis of the adult type is between 0.5% and 1%; (*b*) in unselected samples of contacts (using this word in its broadest sense) the incidence is between 3% and 6%." Opie, writing in 1935, said: "Since in persons exposed to tuberculosis after 15 years of age the frequency of infection, like that of early childhood under corresponding conditions, increases rapidly and far exceeds that of the general population, the adult type of pulmonary tuberculosis is evidently acquired by contact."

I fancy that Dr. Jacobs may have been a little too generous in allowing 15,000 as the number of tuberculous persons turned from sanatoria and hospitals in 1939, but it is safe to assume that they reckoned among their ranks a greater percentage of sputum-positive persons than those outside the institutes who keep up the normal entry by spreading the disease to others. It seems a fair guess, however, that those sent back to ordinary life were at least four times as many as the total number of persons constituting the "increase" since the beginning of the war. Nor is it true that those turned from sanatoria went back to a life the same as they had temporarily left. They emerged to find the nation at war. Many of them entered the Army and more still were evacuated to new homes and new surroundings to spread infection to comrades or to women and children in contact with them.

I will not quote my friend's epigram again, as it disturbs Dr. Jacobs, but I hope, Sir, that it will not be forgotten.—I am, etc.,

Cheam, Surrey, Nov. 20. S. LYLE CUMMINS.

Hemiprostatectomy for Unilateral Adenomatous Enlargement

SIR,—I was interested to read Mr. Sampson Handley's article on hemiprostatectomy for unilateral adenomatous enlargement (November 15, p. 681). While admitting that hemiprostatectomy should have a place in the operative treatment of benign prostatic enlargement, I do not agree with him when he states that in his opinion in about one case in five it may prove to be the operation of choice. In my opinion hemiprostatectomy should be practised only in a really "bad risk" type of patient, much less often than Mr. Sampson Handley would seem to advocate. In my last 200 cases of simple enlargement of the prostate treated surgically I find I have performed hemiprostatectomy four times.

Some of the disadvantages of the operation are: (1) Enlargement of the residual lobe may at a later date necessitate a second operation. (2) The vesical outlet is not so large and therefore the outflow of urine is not so free as after complete prostatectomy, and as a consequence the suprapubic opening usually takes longer to heal. (3) Residual urine is more often present after hemiprostatectomy than after the total operation. The disadvantages of the operation are very obvious, and there must, therefore, be something present in the condition of the patient to make the complete operation very dangerous before hemiprostatectomy is resorted to.

The following case on which I recently performed hemiprostatectomy is typical of the class of patient for whom I should recommend this type of operation. A very stout man aged 66, about two months before consulting me, suffered from retention of urine; the retention was treated by catheterization and the insertion of a large de Pezzer tube. He suffered from bronchitis and cardiac disease, with oedema of the feet and legs. Sooner than continue with suprapubic drainage he decided to risk the second operation. He had an adenomatous enlargement of the right lobe, but no palpable enlargement of the left. I felt he would not stand the shock, etc., of a complete prostatectomy, and in consequence removed only the palpable enlargement on the right side. He made an uninterrupted recovery, and nineteen days after the operation the suprapubic opening was closed and he was passing urine without difficulty.—I am, etc.,

London, W.1, Nov. 20. W. K. IRWIN.

National War Formulary

SIR,—Most of us will be pleased to have the new *National War Formulary*, but the way this is being introduced seems likely to cause unnecessary waste of drugs and expense for the chemists. Many of these have the old stock mixtures already made up and have laid in stocks of drugs for the winter. When the new *Formulary* is introduced on December 1 many of these stocks will lie idle or waste. It would seem wise to have a period during which doctors could order medicines according to the old *Formulary* or, if not in stock, according to the new, or, alternatively, for the chemist to be empowered to substitute equivalent mixtures according to the old *Formulary* in place of the new ones until his stocks are used up. The exact details may be difficult to arrange and may not satisfy the purist, but "needs must when the devil drives," and when it is necessary to economize drugs it seems wrong to allow existing stocks to be wasted.

I see that boric acid has finally come into official disfavour for external application, but before it is relegated to the limbo of the past it might be wise to remember what our fathers and grandfathers did with it in urinary infections. It was probably "the best drug ever" for the stinking urine of old people, now happily seldom seen or smelt. I have used most urinary antiseptics—hexamine, amphotropin, cylotropin, pyridium, neotropin, mandalates, and sulphonamides—and I still find a use for boric acid. It is one of the surest drugs for rendering the urine acid, and when there is any residual urine an ounce or two of boric lotion, preferably with a little cardamoms and well diluted with water, will seldom cause any gastric irritation and will "keep the water sweet," as our forebears used to say, better than anything else. When there is so much need to conserve the work of our chemical firms such a simple remedy should not be overlooked even though it is old-fashioned. It is especially useful where a patient is unwilling to adopt the special measures required for the successful working of the newer antiseptics, and, as should be in such cases, it is vastly cheaper.—I am, etc.,

Winsford, Cheshire, Nov. 17. W. N. LEAK.

Hyaluronidase

SIR,—I am extremely interested in the annotation on hyaluronidase (November 15, p. 699). Your account of the work of Chain and Duthie, K. Meyer, and D. McLean indicates clearly that in the process of septic inflammation a bacterial enzyme is formed capable of destroying at least part of the protective surrounding of normal cells—the hyaluronic acid. I think I am justified in claiming that this discovery goes some way to confirm the theory which I put forward last year ("Hypertonic Sodium Sulphate Treatment of Infected Wounds,"

Lancet, February 3, 1940, p. 216) to explain the processes of septic inflammation and the effect of hypertonic saline applications—namely, that "the bacterial toxin . . . damages the cell wall; this becomes permeable to the osmotic pressure exerted between the slightly hypertonic cell protoplasm and the lymph outside, and immediately the cell begins to absorb water." From this I deduced that all the signs of septic inflammation could be explained and the effect thereon of the application of hypertonic sodium sulphate.

The beneficial effects of such treatment are becoming generally recognized. Correspondence in the medical press and the inclusion in the new *National War Formulary* of a lotion containing 25% of sodium sulphate for the hypertonic treatment of war wounds and similar conditions are sufficient proof. But the theory which I put forward has also a certain practical value, particularly in relation to the treatment of burns. If I am correct, then the osmotic effect of the hypertonic solution is exerted not at the surface of the wound, where no semi-permeable membrane exists, but at the cell membranes in the tissues rendered semi-permeable by the enzymes of the bacteria. The diminution of cellular oedema resulting from this osmotic effect is then the cause of the reduction of the local excess of lymph among the tissues, not by removal towards the surface of the wound but by reabsorption along the lymph spaces and lymphatic capillaries, which had previously been choked by the cellular swelling. The importance of this will be at once recognized, because if this is true then it is correct to apply the hypertonic treatment even to large burns where the loss of lymph from the surface can be in itself serious, since such loss is diminished, not increased, by such applications; and this is, in fact, my own experience.—I am, etc.,

York, Nov. 16. J. C. Lyth.

Myositis and Fibrositis

Sir,—"How long will both these terms [myositis and fibrositis] remain entirely devoid of pathological significance?" With all respect to the writer of your admirable leader on sciatic pain (November 15, p. 698), the answer seems to be: Until he is better acquainted with the literature on the subject.

Prof. Ralph Stockman, in his scholarly monograph *Rheumatism and Arthritis* (1920), says: "So far as I am aware it was William Balfour, an Edinburgh practitioner, who first described (1816) the occurrence of definite thickenings in chronic rheumatism, and thereby established the pathology of the condition." During the next hundred years Balfour's original observations were repeatedly confirmed, and the treatment which he advocated by "friction, percussion, and compression" is essentially the same as modern physiotherapy. In 1904 Gowers proposed the name "fibrositis" to describe the pathological condition responsible for lumbago; and in the same year Stockman published independently "a detailed account of the whole condition with a description of the histology and structure of the fibrous indurations, and showed that chronic rheumatism in all its forms depends on the presence of this chronically inflamed, pathological, new fibrous tissue." It may well be that the application of modern histological technique will throw more light on the pathogenesis of chronic rheumatism, but it is certainly incorrect to imply that the subject has not yet been explored.—I am, etc.,

Bridge of Weir, Nov. 15. Stanley Alstead.

Treatment of Hallux Valgus in Soldiers

Sir,—The various letters on this lesion will be read with interest by many of our profession, and as the lesion is all too common it is well that opinions should be expressed.

In my own experience excellent subjective, cosmetic, and functional results may be obtained in the large majority of these cases by any of the types of operation already mentioned. My failures, however, have led me to deal cautiously with certain cases. At one stage I adopted Keller's operation unreservedly till I met with two disappointments. In one of these the patient was over 40 years of age and in the other under. The latter had an arthroplasty done, and yet in both cases a bridge of bone formed between the raw proximal end of the cut first phalanx and the excised exostosis on the metatarsal head. Both cases had been immobilized for three weeks. Just recently in an over-40 case done two years ago I found extreme pain on walking localized to the base of the first toe. This is due to a large arthritic lip, which has grown laterally from the base of the first phalanx of the great toe. In this case the head of the first metatarsal bone only had been removed. I take it that the stimulus to this outgrowth is the undue strain placed on the lateral ligaments of the metatarso-phalangeal joint of the great toe, when that part was placed across in its more medial position. These ligaments were not tenotomized.

For some time now my personal view as to the operative treatment of hallux valgus has been to select the procedure that best suits each individual case, not forgetting that the frequent concomitant foot lesions must also receive appropriate attention. To complete certain cases and avoid bridges of bone, etc., may mean a two-stage operation. The final result must give no bunion, a painless and actively mobile great toe, and preserve the pillars of the transverse arch. Where I find it necessary to deal with the distal end of the first metatarsal bone in order to preserve the pillar, I incise the head so that the plantar end of the cut ends just where cartilage meets bone. This slanting cut allows for an easy 20 degrees of dorsiflexion as mentioned by Mr. Sayle Creer (*Journal*, November 15, p. 710).—I am, etc.,

Dundee, Nov. 14. John J. Robb, M.B., F.R.C.S.Ed.

Testing Night Vision

Sir,—While Mr. N. Bishop Harman (November 1, p. 632) is correct in attributing my interest in dark adaptation to a vitamin motive, he will, I trust, allow that a requirement of the scientific approach to the problem is an investigation into methods of accurate measurement of dark adaptation, and my letter was concerned only with that aspect of the problem. In any case it is well established that the causes of faulty dark adaptation are many and varied.

During the investigation of many phenomena considerable modifications of view have resulted from refinement of instruments and techniques, and this has already held good for dark adaptation. Further knowledge of this phenomenon will depend upon our aiming at the highest accuracy, and it seems to us that a most useful development would be a sufficient standardization of methods and techniques (in the light of present knowledge) which will enable the results of different observers to be compared and correlated. In pursuit of this purpose there is considerable agreement that the following criteria of test conditions must be considered: previous light and dark adaptation; size and nature of test object, with control of illumination without alteration of spectral values; pupil diameter; fixation point; the data obtained to represent the whole or an appreciable part of the course of dark adaptation, and to be presented in a uniform manner.

In the light of the above we attempted to point out what seemed to be some of the limitations of Mr. Bishop Harman's test. Mr. Bishop Harman says he could always reach his "normal" range in five minutes even when he came into the dark room from the bright sunshine. From this, and from the published figures of illumination used, it is clear that the whole test, in spite of the small variable range of illumination made possible by varying the distances, is carried out at a relatively high light intensity, far above the final rod threshold. This, of course, explains why improvement is not ascertainable upon retesting.

Regarding the accurate control of the test illumination, the "standard candle" has not been used as the standard of illumination since about 1900 for the reasons stated. We felt justified, therefore, in suggesting that the test should not be regarded as an accurate one.

The literature is now, of course, very extensive, but support of the above statements can be found in the following: "Dark Adaptation," review of literature, D. Adams, Medical Research Council, 1929; "Review of Recent Literature," Sloan, *Archives of Ophthalmology*, June, 1939, **21**, 913; "Some Basic Principles of Dark Adaptation," MacDonald, *Archives of Ophthalmology*, April, 1940, **23**, 841; "Dark Adaptation," Mandelbaum, *Archives of Ophthalmology*, August, 1941, **26**, 203; "Rods, Cones, and the Chemical Basis of Vision," Hacht, *Physiological Review*, April 17, 1937.—I am, etc.,

The Crookes Laboratories, The Research Department, Nov. 18. E. W. Godding.

Staffing of Hospitals

SIR,—Critics of municipal hospitals have paid little attention to the gradual change in method of staffing all hospitals. The traditional staff of part-time consultants with resident house officers was first supplemented towards the close of last century by the appointment at teaching schools of full-time pathologists. Later, the clinical staffs were reinforced by the creation of registrars and resident surgical officers, and full-time anaesthetists followed.

In the years following the last war a number of London and Scottish schools altered the conditions of tenure of professorial chairs by restricting private practice and requiring more time to be devoted to hospital and teaching duties. About this time also a number of hospitals employed full-time radiologists. The most recent exhibition of this tendency is in regard to orthopaedic surgeons. "The results were often disastrous," says Mr. Watson Jones, "not because surgeons were lacking in skill, but because this skill was not available to the patient at the moment that it was most required." What is this but an argument in favour of the municipal method of staffing, and one, moreover, recently recognized in Birmingham by the establishment of an Accident Centre with a full-time director?

In view of this tendency enthusiasts for the voluntary system should pause before condemning the municipal, at any rate on the score of its method of staffing. It is also worthy of note that that favourite target—the medical superintendent—is not a recent municipal invention, but was begotten of the Scottish voluntary hospitals at a time when the consultants were "giants, but quarrelsome giants."—I am, etc.,

Burnley, Nov. 15. A. DUFF.

A Municipal Hospital

SIR,—The record of facts concerning the Redhill County Hospital, Edgware, as set out by its permanent staff (November 15, p. 711), looks quite Utopian on paper. With some experience of the scheme in practice there, I feel that the disadvantages should also be recorded.

1. That most pernicious of our national characteristics—the tendency to get into a complacent rut—is fostered by the security of tenure and financial security without private practice.

2. The two greatest stimulants to progress and initiative—namely, competition and the struggle for existence—are completely eliminated by this scheme.

The best-run, most progressive municipal hospital of my experience was presided over by a superintendent who may fairly be described as a benevolent tyrant. However, after many months under both systems, I am happy to be back in the voluntary hospital service.—I am, etc.,

Royal Infirmary, Preston, Nov. 16. UNA M. WESTELL.

Diabetes and Chronic Nephritis

SIR,—Dr. Tadeusz Markowicz's letter on diabetes and chronic nephritis (November 8, p. 670) raises some interesting questions.

His letter does not display evidence of chronic nephritis in the case under consideration. Oedema can, I believe, be a feature of diabetes mellitus. No degenerative lesion of the kidney could be removed by an injection of mersalyl. The absence of albumin after the injection disproves the presence of a chronic kidney lesion. The functional disturbance to which albuminuria may be attributed is sufficient to account for a few epithelial cells and hyaline casts. Just what is the intimate mechanism which produces albuminuria is, so far as I know, unknown to medical science.

What was the action of the mersalyl and how did it produce its results? A possible explanation is that it altered the renal threshold. It was pointed out in these columns some years ago that a diabetic glucose-tolerance curve may be present without glycosuria. This must have been the situation five hours after the mersalyl, when the urine was sugar-free. The work done by the kidney in separating water and salts for excretion against the osmotic pull of a blood sugar of 226 mg. per 100 c.cm. must be very great indeed. No theory of the physiology of the kidney can, so far as I can see, explain it.

None the less, the diuresis must be looked upon as responsible for the improvement in the general condition. The obvious suggestion is that the improvement of the water balance facilitated the function of the peripheral tissues, possibly improving their capacity for using sugar.

The problem presented by the function of the kidney in diabetes calls to mind that the disease was first named after the polyuria. The pituitary, which is now being introduced into our picture of the dysfunction of diabetes mellitus, is associated with another form of polyuria in diabetes insipidus. But whereas substitution therapy with posterior lobe extract will abate polyuria in insipidus, removal of the gland abates it in the diabetic animal. If we assume, as is reasonable, that pituitary extract acts on the kidney in cases of diabetes insipidus, we are at a loss in any attempt to envisage the nature of that action by reason of our ignorance of the intimate nature of kidney function. It is, however, to be noticed that in cases of diabetes insipidus the kidney is able to separate excreted water from salts, an achievement similar to that required to explain the action of mersalyl in the present case.—I am, etc.,

Coventry, Nov. 18. K. E. BARLOW.

The Nutritive Value of Bread

SIR,—May I ask for space to reply to the criticisms made by Dr. Margaret D. Wright (November 15, p. 689) of an experiment of mine in which comparison was made between the nutritive values of wholemeal and white flour to which extra vitamin B_1 was added (*Lancet*, October 26, 1940).

In my experiment two groups of litter-mate rats, 4 weeks old, received Diets 1 and 2 containing, respectively, 88% of white flour (73% extraction) and 82% of wholemeal (100% extraction). Both flours were obtained from the same wheat. In order to ensure optimum provision of protein and minerals, both diets contained purified casein (6%) and salt mixture (2%); cotton-seed oil was also present (4%). All the rats received a daily dose of cod-liver oil to provide vitamins A and D, and those on Diet 1 also 10 μg. daily of pure vitamin B_1 to correct the deficiency in this vitamin. The rats on Diet 1 increased in weight (av. 12 g. weekly) at about one-half the rate of those on Diet 2 (av. 23 g. weekly); when after two weeks the diets were changed over, the relative growth rates changed correspondingly. The rats receiving Diet 2 ate more food but also made better use of it, the average weight of ingested dry food (2.3 g.) corresponding to a weight increase of 1 g., being about 30% less than was the case with Diet 1 (3.1 g.). From this result the conclusion was drawn that white flour, even when extra vitamin B_1 is given and the defects in protein and minerals also corrected, is still inferior in nutritive value to wholemeal. The residual defect was held to be a relative lack of the B_2 vitamins, and this conclusion has since been confirmed by work carried out in this Division by Miss A. M. Copping, who has shown white flour to be inferior to wholemeal in its content of riboflavin, vitamin B_6, and "filtrate factors."

Dr. Wright's chief criticisms may be summarized and answered as follows:

1. Dr. Wright considers that the rats receiving the white-flour diet increased in weight less rapidly because they ate less food and thus obtained less protein, the reason for the smaller appetite being not that this diet was less nutritious but that it was less palatable than the corresponding one made with wholemeal. Whatever the diet, increase of weight in young growing animals depends on the amount of food intake. Increase of appetite, with corresponding increase of growth rate, is a usual occurrence when, for example, an essential vitamin is added to a diet in which it has been hitherto lacking. This is a result of the enhanced nutritive value of the food, and occurs even when the vitamin is given as a minute dose of the pure substance, and can have no effect on the palatability of the ration as a whole. The rats receiving the wholemeal diet in my experiment not only ate more of it but, as stated above, utilized it to better advantage than did those having the white-flour diet.

2. Dr. Wright states that the rats receiving the white-flour diet received less vitamin B_1 than those on the wholemeal diet. This may be true, but 10 μg. daily, which the former received, has been found more than adequate for normal growth in rats of the age and weight employed.

3. Dr. Wright also considers that the rats receiving the white-flour diet received less vitamin E than those having wholemeal, which contains the germ. Adequate vitamin E was, however, supplied in both diets in the cotton-seed oil included.

In this laboratory rats have been reared for more than two generations on an artificial diet in which a small amount of cotton-seed oil was the only source of vitamin E.

4. The number of animals (nine in all) employed in my experiment is considered too small to enable satisfactory conclusions to be drawn. The results were, however, so clear-cut that I have no reason to doubt their significance. In my own experience, as much information may often be gained from nutritional trials on a few animals, individually observed and cared for, as from others involving large numbers.

One error in Dr. Wright's account of my work should be corrected—namely, the statement that my comparison was made between "a straight-run white flour (73% extraction)" and "wholemeal (82% extraction)." The "wholemeal" flour used by me contained, as the term signifies, 100% of the grain.—I am, etc.,

HARRIETTE CHICK.

Division of Nutrition,
The Lister Institute, Nov. 23.

Anglo-Soviet Medical Committee

SIR,—The Anglo-Soviet Medical Committee invites members of the medical and dental professions and students of these professions to give their support to the work of the Committee by becoming associate members. The aims of this body have already been published in medical and dental journals, but for those who did not see the original announcement they are as follows: (1) To form a liaison between the medical professions of both countries. (2) To exchange the latest clinical and scientific knowledge. (3) To facilitate visits of medical specialists between the two countries. (4) To give specialist advice on medical aid to the U.S.S.R.

It is proposed to make the minimum subscription for associate members 5s. per annum, the funds so raised to be used for the expenses of the Committee's work. A bulletin will be issued from time to time giving reports on the work accomplished by the Committee. A general meeting for members and associate members will be held early in the new year. Those who wish to become associate members should write to the hon. secretary, Anglo-Soviet Medical Committee, c/o the Royal Society of Medicine, 1, Wimpole Street, London, W.1. The Committee feels that there are many members of the medical and dental professions who would like to take this opportunity of contributing to the national effort and assisting our ally.—We are, etc.,

ALFRED WEBB-JOHNSON,
President.
H. HAROLD SCOTT,
Chairman of the Executive Committee.
PHILIP MANSON-BAHR,
JOHN A. RYLE,
Members of the Executive Committee.

Nov. 17.

Obituary

WILLIAM JAMES PENFOLD, M.B., C.M.Ed., B.Hy. D.P.H.Durh.

The report of the death in Melbourne on October 27 of Dr. W. J. Penfold will be received with great regret by his former bacteriological confrères in this country, and by old colleagues who still retain a vivid memory of his personality and a very conscious appreciation of his scientific achievements during his eight years' sojourn (1908-16) at the Lister Institute, first as B.M.A. scholar and later as a member of the bacteriological staff.

Entering the research field as he did after some twelve years of medical practice it is remarkable that he so rapidly accommodated himself to the laboratory life and that he succeeded in producing in the short space of eight years work of such high quality and permanent value. All the time he was the thinker, tensely strung up until he could submit to experiment some idea that may have come to him overnight. At times, indeed, his fertile imagination presented him with ideas for experiment that in his own interest it seemed desirable to restrain him from exploiting, but throughout he proved himself a most acute observer, eminently judicious in drawing conclusions while determined to secure the last ounce of information from his data. In all he published some twenty-five papers during these eight years, the majority of which were concerned with the experimental study of variation and mutation in bacteria—a study which was then engaging the attention of many bacteriologists in this country and abroad. To this subject, particularly in connexion with the fermentative properties of *B. typhosum* and the coliform bacteria of the intestine, he made many significant and substantial contributions which cannot be detailed here, but I would stress that their significance was all the greater from the fact that with the co-operation of Harden and other biochemical colleagues he was able to throw light on the laws governing the variations studied and on the enzymic mechanisms possessed by the variant forms. On the subject of salvarsan fever, salt fever, and experimental fever following the introduction of bacterial pyrogens he collaborated in a valuable series of papers with the late Dr. E. C. Hort. At the King George Hospital in the early years of the last war he collaborated with the writer in an investigation of typhoid, paratyphoid, and dysentery cases from the Dardanelles, and with Dr. Major Greenwood he carried out an inquiry into the possibilities of preventive inoculation against meningococcal infection during the prevalence of cerebrospinal meningitis in Salisbury.

In 1916 Penfold resigned his post at the Lister to take over the organization and control of what are now the Commonwealth Serum Laboratories in Melbourne, with their many additional responsibilities in the manufacture of biological products of all kinds. The success of this establishment in the intervening years is in great measure due to Penfold's administrative and organizing powers during its formative phase and to the energy he threw into the formidable task set him on his arrival in Australia. Of necessity but none the less regrettably the new sphere of work broke the continuity of the researches to which he was so wholeheartedly devoted in England, but soon problems of a different kind attracted his attention. For a time he was greatly intrigued with and strongly advocated the practice of "refusion," by which is understood the returning to the horse of the deposited red cells from a bleeding, thus assisting the animal, or so it was believed, to sustain the loss of much greater quantities of blood within a short interval.

In 1927 Penfold resigned his directorship of the Commonwealth Serum Laboratories to take up the newly created post of Director of the Baker and Shaw Medical Research Institute attached to the Alfred Hospital, for the pathological work of which it also catered. Here, attracted by the varied pathological material available, Penfold was able to resume in great measure his research activities, and between 1927 and 1938, when he retired, he contributed to the *Medical Journal of Australia*, with the co-operation of various colleagues and pupils, including his son, H. B. Penfold, a steady flow of papers on a great variety of subjects, the mere titles of which give ample evidence of his curious, versatile, and inventive mind. In 1935 he gave the Bancroft Memorial Lecture on medical research in Australia, and in the same year took a prominent part in the work of the Annual Meeting of the British Medical Association in Melbourne. His retirement in 1938 from the Baker Institute was followed by many tributes to his work for Australia since his arrival there in 1916. In Melbourne scientific circles he will, I feel sure, be greatly missed, for he was a doughty controversialist and a ready speaker in debate on any platform, scientific or political. By those with whom he worked in London some thirty years ago he will be remembered as a most amiable and stimulating colleague. *Ave atque vale.*

J. C. G. L.

The following well-known medical men have died abroad: Dr. F. KAPKA, director of the psychiatric clinic at Prague; Dr. ALEXANDER WESTPHAL, professor of neurology and psychiatry at Bonn; Dr. HEINRICH KLEIN, professor of neurology and psychiatry at Leipzig, aged 66; Dr. MAX AARON GOLDSTEIN, founder and editor of the *Laryngoscope* and past president of the American Academy of Ophthalmology and Oto-laryngology, aged 71; Dr. MEYER BODANSKY, professor of pathological chemistry at the University of Texas School of Medicine and author of *Introduction to Biological Chemistry*, aged 45; and Dr. JOHN PRICE CROZER GRIFFITH, emeritus professor of paediatrics in the University of Pennsylvania and author of a well-known textbook on diseases of infants and children.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

Diploma in Medical Radiology and Electrology

The University of Cambridge has decided that the regulations for the Diploma in Medical Radiology and Electrology will be rescinded on October 31, 1942, and no examinations will be held and no diplomas granted after that date. The course which started in October, 1941, is therefore the last course that will be given for the diploma.

UNIVERSITY OF LONDON

LONDON HOSPITAL MEDICAL COLLEGE

Hutchinson Triennial Prize

The subject for the next Hutchinson Triennial Prize is "The Investigation and Treatment of Sciatic Pain," and dissertations must be delivered at the London Hospital by October 31, 1944. Full conditions may be obtained on application to the Dean of the London Hospital Medical College, Turner Street, Whitechapel, E.1.

UNIVERSITY OF SHEFFIELD

At a meeting of the University Council held on November 14 the following appointments were made:

Medical Tutors, Drs. H. P. Brody and J. Pemberton. *Surgical Tutors*, Messrs. A. W. Fawcett and H. Blacow Yates. *Obstetrical Tutor*, Dr. W. J. McCord. *Honorary Lecturer in Applied Anatomy*, Mr. J. T. Chesterman. *Research Assistant to the Department of Pathology and to the University Cancer Research Laboratories*, Dr. M. J. Pivawer. *Representatives on the Committee of Management of Sheffield Hospitals Council*, Profs. H. N. Green and E. J. Wayne.

UNIVERSITY OF WALES

WELSH NATIONAL SCHOOL OF MEDICINE

The following candidate has satisfied the examiners at the examination indicated:

M.B., B.CH.—*Medicine:* A. A. Edwards.

The Services

HONORARY SURGEONS TO THE KING

Major-General G. Wilson, C.B.E., M.C., late R.A.M.C., and Colonel (temporary Brigadier) D. T. Richardson, M.C., late R.A.M.C., have been appointed Honorary Surgeons to the King in succession to Major-General A. D. Fraser, D.S.O., M.C., late R.A.M.C., retired, and Major-General F. Casement, D.S.O., late R.A.M.C., retired, respectively.

HOME GUARD AWARD

The M.B.E. has been awarded to Lieutenant George Dunluce Eccles, M.C., M.B., B.S., Home Guard (Dawlish), in recognition of conspicuous gallantry in carrying out hazardous work in a very brave manner.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL NAVY

Surgeon Lieut. FREDERICK BAGOT, R.N.V.R., is posted as "Missing, Presumed Killed," in an Admiralty Casualty List published on November 19. He was educated at the University of Manchester, where he graduated M.B., Ch.B. in 1932. He had held the post of house-surgeon at Ancoats Hospital and at St. Mary's Maternity Hospital, Manchester, and specialist house-surgeon at Manchester Royal Infirmary. Before the war he was in practice at Chorlton-cum-Hardy. He entered the R.N.V.R. as probationary surgeon lieutenant in October, 1938, and was confirmed in that rank one year later. In the *Journal* of July 12 (p. 72) we announced that Surgeon Lieut. Bagot had been mentioned in dispatches "for good services in the last six months or more of war." He was a member of the British Medical Association.

Wounded or Injured

Probationary Temporary Surgeon Lieut. Thomas McGowan Watt, R.N.V.R.

ROYAL ARMY MEDICAL CORPS

Captain WILLIAM DAVID MOORE, who died on November 12 as the result of a road accident, was educated at the University of Edinburgh, where he graduated M.B., Ch.B. in 1927. He was in practice in Edinburgh until 1935, when he moved to Blackburn, and soon after the war broke out entered the R.A.M.C. as lieutenant, being promoted to captain a year later. He was attached to the R.A.O.C. The funeral took place at Worksop on November 17.

ROYAL AIR FORCE

Flying Officer HAROLD SIDNEY MELLOWS, R.A.F.V.R., died in November, aged 31. He was the son of the late Alderman W. M. and Mrs. Mellows, and received his medical education at King's College Hospital, qualifying M.R.C.S., L.R.C.P. in 1935. He also took the Cambridge degrees of B.Chir. in 1936 and M.B. in 1937. After holding the post of house-surgeon at King's College Hospital he settled in practice at West Wickham, Kent. He entered the R.A.F.V.R. as flying officer in 1940.

Flying Officer ANTONY FLEMING BALDWYN, R.A.F., who is reported "missing but presumed to have lost his life" on active service in the Middle East, was the eldest son of Mrs. Cecil Baldwyn and the late Captain C. F. Baldwyn. He graduated M.B., B.S. of the University of London in 1940 and, after holding junior house posts at St. Bartholomew's Hospital, entered the R.A.F. as flying officer in the same year. He was a member of the British Medical Association.

Medical Notes in Parliament

Home Guard Medical Officers

Mr. GROVES asked on November 18 if the Secretary of State for War would raise the age of enlistment for Home Guard medical officers, since over-age doctors still in practice must necessarily be employed but could not benefit from classes of instruction, etc., unless they were actually enrolled in the Home Guard. Captain MARGESSON replied that cases of this kind were considered on their merits. In general the upper age limit was not strictly enforced in the case of medical practitioners wishing to enrol as medical officers in the Home Guard, provided that they were fit.

Mr. GROVES also asked whether it was the considered policy of his Department that some medical advisers of the Home Guard should be appointed from among the whole-time servants of local authorities; and, if so, whether he would give an assurance that such officers had sufficient time for the duties which would be imposed upon them. Captain MARGESSON said that to avoid undue interference with the medical organization of the locality it had been decided that no medical practitioner might be enrolled in the Home Guard unless previous permission had been given by the Local Medical War Committee, which was aware of the professional commitments of practitioners in its area. This should ensure that Home Guard appointments were not inconsistent with the fulfilment of a practitioner's existing obligations. Replying to another question, Captain Margesson said a course for Home Guard medical officers had been arranged for next month, and further courses would be held as found necessary. Instructions and information regarding such courses were issued through the normal military channels.

On the same day Mr. GROVES asked the Minister of Health whether he was aware that in various parts of the country whole-time medical officers of health, already overworked by the addition of A.R.P. duties to those which they ordinarily undertook, were now assuming the duties of Home Guard medical officers, involving the training of men and a great deal of administrative work, and whether arrangements were being made for recognition of such services. Mr. ERNEST BROWN said: I understand that some medical officers of health have found it possible to undertake the duties of Home Guard medical officers in addition to their official duties, the appointments being on an honorary basis as in the case of all other Home Guard medical officers. I am sure that their action in so doing is greatly appreciated by the Secretary of State for War. When approving the appointment of these medical officers, the Local Medical War Committees no doubt paid due regard to their other commitments.

American Doctors in the E.M.S.

On November 19 Sir ERNEST GRAHAM-LITTLE asked the Minister of Health to what services the medical practitioners coming from the United States of America to take up work in

this country were being allotted; to what body their original selection and ultimate distribution were entrusted; what remuneration was offered to them; and what remission of the rate of income-tax imposed on British subjects was accorded to them on the salaries paid to them in this country in respect of such service.

Mr. ERNEST BROWN replied: The doctors referred to are being allotted either to the E.M.S. or to the R.A.M.C. according to their own choice. The selection of the doctors, so far as their professional qualifications are concerned, is carried out in America through the National Research Council, the American Medical Association, and other professional bodies. Medical examinations and interviews are arranged in America on behalf of His Majesty's Government. Doctors who choose the E.M.S. are posted to hospitals by the Director-General E.M.S. The remuneration offered to them is the salary appropriate to the grade of medical officer in the E.M.S.—namely, £550 a year plus board and lodging or £100 a year in lieu thereof. I understand that this remuneration is subject to British income tax in the ordinary way, but the amount of the tax is repaid to the doctors by my Department, subject to the deduction of a sum equivalent to American income tax at current rates. The distribution and remuneration of those doctors who elect to serve in the R.A.M.C. are matters for the Secretary of State for War.

EPIDEMIOLOGICAL NOTES

Discussion of Table

A general rise in the incidence of infectious diseases, with the exception of paratyphoid and typhoid, occurred during the week in England and Wales. This increase contrasts sharply with the decline recorded in the preceding week. The increase in the notifications of diphtheria, 154 cases, was confined to the northern sections of the country; the largest increases were those of the north-western counties 54, and Wales 42. In London and the southern counties the incidence of diphtheria declined. The rise in the number of cases of scarlet fever, 162, was fairly general throughout the country, and so was the increased incidence of pneumonia, although this was greatest in the northern counties. The number of cases of measles was 123 in excess of the total for the preceding week. The increase was mainly contributed by the sharp outbreak in Kent, Eastry R.D., where 94 cases were notified compared with 5 in the previous week.

In Scotland the number of notifications of diphtheria and scarlet fever declined, while the cases of whooping-cough and measles exceeded in number the total of the previous week.

Dysentery

No new outbreak of any size was reported during the week in England and Wales, the largest being that of Berkshire, Windsor R.D. 4. The rise in the notifications, 25 cases, was due to increased incidence in the local outbreaks reported in the preceding week. The chief of these were: London, Wandsworth 9; Surrey, Coulsdon and Purley U.D. 18; Staffordshire, Lichfield R.D. 17; Lancashire, Blackburn R.D. 17, and Whiston R.D. 5; Northumberland, Newcastle C.B. 5, and Gosforth U.D. 4. In Scotland the principal centres of infection were in the burghs of Greenock 10, Aberdeen 12, and Edinburgh 16.

Poliomyelitis

Thirty-three cases of poliomyelitis, an increase of 10, were notified during the week in England and Wales. The largest county totals returned were Kent 5 and Lancashire 4. Multiple cases occurred in the administrative areas of Berkshire, Wokingham R.D. 2; Kent, Crayford U.D. 3; Norfolk, St. Faith's and Aylsham R.D. 2; Wiltshire, Amesbury R.D. 2. One of the 2 cases reported in Scotland was recorded in Edinburgh: during the past four weeks 8 cases have been notified in this city.

Returns for the Week Ending November 15

The number of cases of infectious diseases notified during the week included scarlet fever 1,352, whooping-cough 2,066, diphtheria 1,043, measles 671, pneumonia 997, cerebrospinal fever 104, poliomyelitis 21, dysentery 204, paratyphoid 30, typhoid 9. Thirty-eight deaths were attributed to influenza.

No. 45

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended November 8.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1941 (a)	1941 (b)	1941 (c)	1941 (d)	1941 (e)	1940 (Corresponding Week) (a)	1940 (Corresponding Week) (b)	1940 (Corresponding Week) (c)	1940 (Corresponding Week) (d)	1940 (Corresponding Week) (e)
Cerebrospinal fever	113	6	24	2	9	137	8	28	2	3
Deaths		2	4				1	1		
Diphtheria	1,069	43	275	28	32	1,410	51	477	19	47
Deaths	24	6	7	4	3	31	—	17	1	1
Dysentery	148	12	58	—	—	68	2	50	2	—
Deaths		2	—	—	—		—	—	—	—
Encephalitis lethargica, acute	3	—	1	—	—	4	—	1	—	—
Deaths		—	—				—	—		
Enteric (typhoid and paratyphoid) fever						29	3	7	3	—
Deaths						4	—	—	—	—
Erysipelas		—	80	14	5		—	58	6	6
Deaths			—					—		
Infective enteritis or diarrhoea under 2 years										
Deaths	41	2	16	16	8	29	3	8	5	4
Measles	747	52	29	32	2	13,247	290	526	—	12
Deaths	1	—	—	2		29	1	7	5	—
Ophthalmia neonatorum	84	2	8	—	—	59	1	19	—	—
Deaths										
Paratyphoid fever	31	4	2	—						
Deaths	1	—	—	—						
Pneumonia, influenzal*	731	27	15	1	5	713	51	17	2	4
Deaths (from influenza)	20	—	5	1	5	30	4	3	1	1
Pneumonia, primary		25	214	5			46	146	15	
Deaths				9	—				9	9
Polio-encephalitis, acute	4	—				4	—			
Deaths		—					—			
Poliomyelitis, acute	33	2	2	4	1	42	—	4	—	—
Deaths		—	—	—			—	—		
Puerperal fever	1	1	16	2	1	—	—	17	1	—
Deaths		—					—			
Puerperal pyrexia	107	6	13		—	119	4	13		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,366	36	229	51	30	1,792	104	267	73	52
Deaths	1	—	—	1	—	—	—	2	—	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths		—	—	—	—		—	—	—	—
Typhoid fever†	12	1	2	14	3					
Deaths	—	—								
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	2,029	206	69	31	8	1,925	16	174‡	—	20
Deaths	2	—	—	—	—	16	—	—	1	—
Deaths (0–1 year) Infant mortality rate (per 1,000 live births)	332	32	51	41	26	326	25	52	30	13
Deaths (excluding still-births)	4,296	602	564	211	140	5,281	1,078	629	190	133
Annual death rate (per 1,000 persons living)			12.3	14.0	§			12.7	12.7	11.7
Live births	4,840	462	719	271	213	4,878	400	652	303	200
Annual rate per 1,000 persons living			14.6	18.0	§			13.2	20.2	17.5
Stillbirths	164	13	33			199	21	29		
Rate per 1,000 total births (including stillborn)			44					43		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Notification in certain administrative areas only.

§ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

On December 1, 2, and 3 Dr. E. V. McCollum, Professor of Nutrition, School of Hygiene, Johns Hopkins University, Baltimore, U.S.A., will deliver, in Convocation Hall at the University of Toronto, Canada, the Harben Lectures for 1941 upon "Nutritional Science and Public Health." These lectures are delivered annually under the auspices of the Royal Institute of Public Health and Hygiene in accordance with the terms of the Harben Trust.

Sir Stewart Duke-Elder will deliver a lecture on "Ophthalmological Problems in War" at the Weston Hotel, Bath, on Thursday, December 4, at 5.30 p.m. All Service medical officers and civilian practitioners will be welcome.

A Chadwick Public Lecture on "Post-war Housing in the Light of Wartime Experience" will be given by Mrs. Blaise Gillie at the Royal Society of Tropical Medicine and Hygiene, 26, Portland Place, W.1, on Tuesday, December 9, at 2.30 p.m.

A joint meeting of the Society of Public Analysts and Other Analytical Chemists with the Food Group of the Society of Chemical Industry will be held at the Chemical Society's rooms, Burlington House, Piccadilly, W., on Wednesday, December 3. The meeting will be held in two sessions, beginning at 11.30 a.m. and 2.30 p.m. respectively, and the subject will be "The Fortification (Enrichment) of Human Foods by Addition of Specific Nutrients." The following papers will be read: at the morning session, "The Nutritional Bases for Fortification of Foods," by Mr. A. L. Bacharach, and "The Technological Aspect of Fortification," by Messrs. D. W. Kent-Jones and A. J. Amos; at the afternoon session, "The Machinery for the Enforcement of Standards for Fortified Foods," by Mr. H. E. Cox, D.Sc., and "Analysis of Fortified Foods," by Mr. H. E. Monk.

A joint meeting of the Sections of Laryngology and Otology of the Royal Society of Medicine will be held on Friday, December 5, at 10.30 a.m., when there will be a discussion on "The Effects of Flying on the Nose and Ear." Opening papers will be read by Wing Commander J. F. Simpson, Group Captain E. D. D. Dickson, and Squadron Leaders D. B. Fry, J. E. McGibbon, and R. H. Winfield.

The Ministry of Health has just issued a memorandum on Louse-borne Typhus Fever (Memo. 252/Med.). This briefly summarizes the principal facts about the disease and gives information which will aid local authorities in dealing with any occurrence that might arise.

Lieut.-Colonel R. Brooke, O.B.E., R.A.M.C. (Inner Temple); Major F. H. Blackburn, R.A.M.C., and Mr. E. A. Butterworth, F.R.C.S. (Middle Temple); and Dr. A. P. Ll. Cogswell (Gray's Inn) were called to the Bar on November 17.

Air Vice-Marshal Sir David Munro, Chief Medical Officer of the Ministry of Supply, will open the new medical department at the Longbridge Works of the Austin Motor Company, Ltd., on Wednesday, December 3, at 3 p.m.

The Ministry of Food, in co-operation with the Ministry of Health, has arranged for the free distribution from December 8 of fruit juices and cod-liver oil compound to all children born after January 1, 1940.

Dr. Zing-Yang Kuo, director of the Institute of Physiology and Psychology at Chungking, is on a visit to this country at the request of the Minister of Education for China and by invitation of the Universities' China Committee in London, his object being to promote closer and more effective cultural and educational co-operation between the two countries.

It has been decided not to award any Nobel Prize this year.

Mr. Ernest Brown, Minister of Health, stated recently that up to the end of September A.R.P. first-aid posts in the London region had dealt with 51,554 casualties.

Jewish doctors in Germany who have been authorized to practise again owing to the scarcity of "Aryan" doctors are not permitted to engage "Aryan" nurses to assist them, and Jewish nurses are not allowed to assist "Aryan" doctors.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Treatment of Chilblains

Dr. C. M. STEVENSON (Cambridge) writes in reply to Dr. P. Binnington (November 15, p. 716): May I suggest that the most satisfactory treatment is the intramuscular injection of sodium cacodylate. Twelve minims of a 10% solution in water, repeated if necessary in two weeks' time, will usually give relief for several months. It is simple, and troublesome to neither doctor nor patient.

Congested Hands, Brittle Nails, and Dental Sepsis

Dr. E. U. MACWILLIAM (Bexley, Kent) writes: In this connexion the following case may be of interest. A man aged 54 has suffered from congested hands (as described by "Stasis," October 18, p. 568) since childhood. About five years ago the finger-nails began to become thin and brittle, and since then most of the nails at one time or another became partially detached from the bed. As a rule the condition came on gradually, in some cases affecting almost the whole of the nail, and disappeared in a similar manner. Eight weeks ago, when the mouth was cleared of teeth, several of which were obviously infected, four nails of one hand and three of the other were affected as described. To-day all nails are practically normal. There is also a slight improvement in the congestive condition.

LETTERS, NOTES, ETC.

District Nurse for Home Guard Casualties

Major J. L. FORMAN BULL, medical officer, 5th Montgomeryshire Battalion, Home Guard, writes: In the *Journal* of November 8 (p. 680) you quote the Editor of the *Nursing Mirror* as suggesting that the local district nurses should be utilized to organize casualty collecting posts, especially in isolated country districts. In this Home Guard battalion area, thanks to the energy and foresight of the W.V.S., this scheme has been in existence for some time, and has been amplified. The area covers about 200 square miles and is sparsely populated. In the larger centres of population there are first-aid points in charge either of the local district nurse or, where there is no district nurse, of a retired nurse. Each point has a voluntary staff of women who have had a course of training in home nursing and first aid, and is well equipped to care for casualties even if they have to be retained in the point for twenty-four hours or more. In addition there are sub-points in more isolated areas in charge of women who have had some slight nursing experience or have taken a course of home nursing and first aid. A supply of dressings, etc., is kept in these sub-points, and they can be used as temporary casualty collecting posts. The points have a notice displayed, "First-aid Point," and the sub-points one, "First-aid Dressings." Altogether there are some sixteen first-aid points and six sub-points, and more of the latter are being organized as time goes on. This means that there is a casualty collecting post within easy reach of any part of the battalion area where fighting may occur. As the district nurse may not always be available a second-in-command, who is preferably an ex-nurse, is appointed for each first-aid point.

Paper Salvage

Dr. A. R. NELIGAN (Droitwich) writes: The demand for waste paper and cardboard is great. There must be large amounts of both stored away with old *x*-ray films and serving no useful purpose. I quickly collected two stone of them the other day.